

## **Burlington Development Review Board**

Department of Permitting & Inspections  
645 Pine Street

Burlington, VT 05401

[www.burlingtonvt.gov/DPI/DRB](http://www.burlingtonvt.gov/DPI/DRB)

Telephone: (802) 865-7188

Fax (802) 863-0466

AJ LaRosa  
Caitlin Halpert  
Geoff Hand  
Sean McKenzie  
Brad Rabinowitz  
Chase Taylor  
Evan Gould, (Alternate)  
Vacant, (Alternate)



## **DRB Agenda - Tuesday, October 17, 2023, 5:00 PM,**

**645 Pine Street, Front Conference Room or Remote on Zoom:**

**Please click the link below to join the webinar:**

**Zoom:** <https://us02web.zoom.us/j/83225696227?pwd=SGQ0bTdnS000Wkc3c2J4WWw1dzMxUT09>

**Webinar ID:** 832 2569 6227

**Passcode:** 969186

**Telephone:** US +1 929 205 6099 or +1 301 715 8592 or +1 312 626 6799 or +1 669 900 6833 or +1 253 215 8782  
or +1 346 248 7799

### **1. Agenda**

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### **2. Communications**

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### **3. Minutes**

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### **4. Public Hearing**

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#### **4.1.**

**ZP-23-398; 300 Flynn Avenue (NMU, Ward 5) Howard Center for Human Services, Inc. / Joe Weith**  
**Conditional use approval to demolish existing 24,042 square foot building to construct a new 50,100**  
**square foot building. (Project Manager, Mary O'Neil)**

#### **4.2.**

**ZAP-23-11; 457 South Willard Street (RL, Ward 6) Hope Green / Mark Hall**  
**Appeal of Notice of Violation, ZCPT-23-24, for fence replacement. (Project Manager, Ted Miles)**

### **5. Adjournment**

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### **6. Informational and Non-Discrimination Statements**

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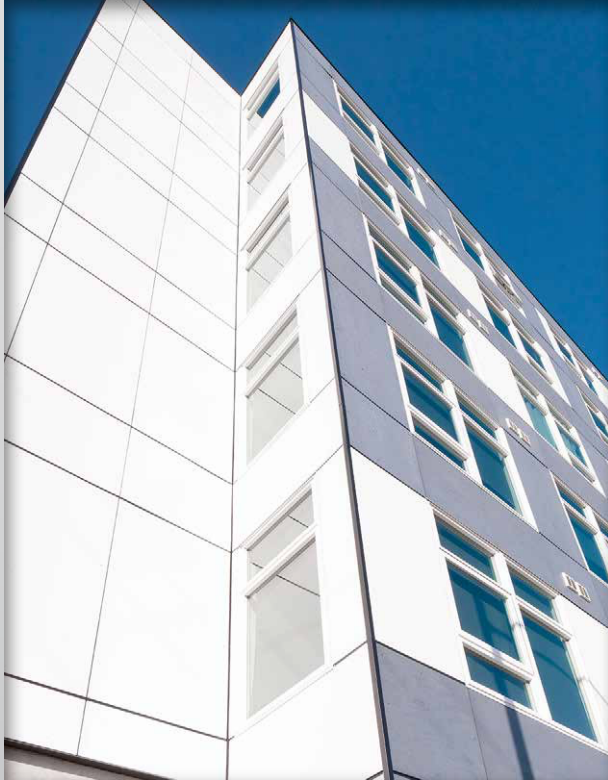
**6.1. Plans may be viewed upon request by contacting the Department of Permitting & Inspections**  
**between the hours of 8:00 a.m. and 4:30 p.m. Participation in the DRB proceeding is a prerequisite to**  
**the right to take any subsequent appeal. Please note that ANYTHING submitted to the Zoning office is**  
**considered public and cannot be kept confidential. This may not be the final order in which items will**  
**be heard. Please view final Agenda, at [www.burlingtonvt.gov/dpi/drb/agendas](http://www.burlingtonvt.gov/dpi/drb/agendas) or the office notice**  
**board, one week before the hearing for the order in which items will be heard.**



**The City of Burlington will not tolerate unlawful harassment or discrimination on the basis of political or religious affiliation, race, color, national origin, place of birth, ancestry, age, sex, sexual orientation, gender identity, marital status, veteran status, disability, HIV positive status, crime victim status or genetic information. The City is also committed to providing proper access to services, facilities, and employment opportunities. For accessibility information or alternative formats, please contact Human Resources Department at (802) 540-2505.**

# **aFC** *cladding*

SUSTAINABLE SOLUTIONS



**American Fiber  
Cement Corporation**

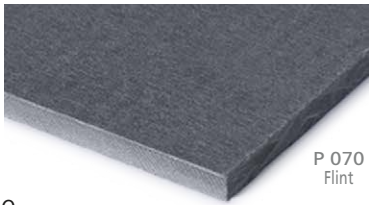
**CENIBRIT**  
Building Better Days

Distributed By:  
Foundry Service & Supplies, Inc.



# Cembrit **Patina**

Cembrit Patina has a natural, textured surface. You can see the fiber and natural characteristics of the raw materials, and you can see and feel the sanding lines on the surface. As the seasons change and the years pass, the natural aging of the fiber cement leaves subtle traces on the surface, and the façade will gradually acquire a distinctive patina.



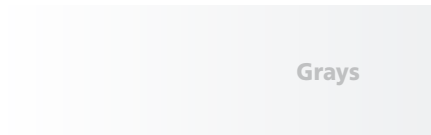
P 020  
Granite



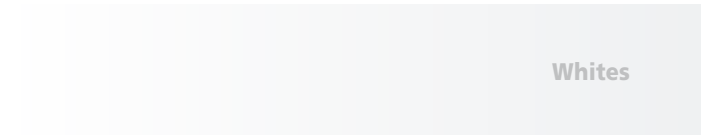
P 050  
Graphite



P 070  
Flint



P 222  
Pearl



P 313  
Tufa



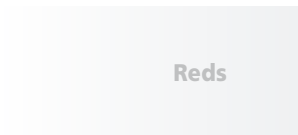
P 323  
Magma



P 333  
Adobe



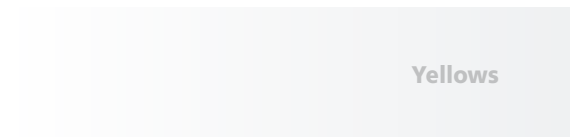
P 343  
Ruby



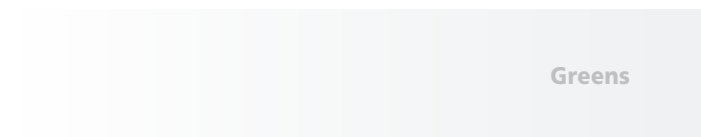
P 545  
Sand



P 565  
Amber



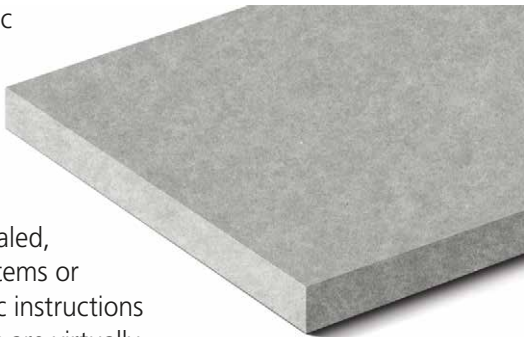
P 626  
Emerald



# Minerit HD (Raw)

Minerit HD is an uncoated fiber cement board that allows the authentic appearance of the fiber cement to stand out. In application, Minerit HD is a building board that can be installed for certain cladding purposes when a natural expression is desired. It's an unpigmented material, so variations may occur in the individual boards and from board to board, adding a lively expression to the façade.

When used for cladding in a rainscreen system, the boards must be sealed, typically on all sides. They can be painted on-site with acrylic paint systems or transparent stains that are suitable for cement-based materials (Specific instructions for painting/staining are available). After surface treatment, the boards are virtually maintenance free. In industrial applications where the surface appearance is of less importance, the boards do not need to be sealed but efflorescence will likely occur over time depending on the type of exposure and climate conditions.



The color charts displayed in this brochure give an impression of the available colors. Reproduction of the exact colors is restricted by the printing process. For an exact color match, samples are available upon request.

| Cover, Patina, Patina Rough, Transparent and Solid |                             |                         |                            |
|----------------------------------------------------|-----------------------------|-------------------------|----------------------------|
| U.S. Trimmed sizes in. (mm)                        |                             | Weight (lbs/ft²)        |                            |
| Thickness                                          | 8 mm                        | Patina and Patina Rough | Cover, Transparent & Solid |
| Width                                              | 48 (1,220)                  | 2.5                     | 2.9                        |
| Length                                             | 96 (2,440)      120 (3,050) |                         |                            |

| Patina Inline               |                                                  |                  |
|-----------------------------|--------------------------------------------------|------------------|
| U.S. Trimmed sizes in. (mm) |                                                  | Weight (lbs/ft²) |
| Thickness                   | 9.5 mm (non-grooved areas), 8 mm (grooved areas) | Patina Inline    |
| Width                       | 48 (1,220)                                       | 2.9              |
| Length                      | 96 (2,440)      120 (3,050)                      |                  |

| Minerit HD                       |                          |             |                                                                              |      |      |       |
|----------------------------------|--------------------------|-------------|------------------------------------------------------------------------------|------|------|-------|
| Trimmed sizes — in. nominal (mm) |                          |             | Weight (lbs/ft²)                                                             |      |      |       |
| Thickness                        | 4 mm, 6 mm 8 mm or 10 mm |             | 4 mm                                                                         | 6 mm | 8 mm | 10 mm |
| Width                            | 48 (1,220)               |             | 1.6                                                                          | 2.3  | 3.1  | 3.9   |
| Length                           | 96 (2,440)               | 120 (3,050) | The recommended thickness for Minerit HD in a rainscreen application is 8mm. |      |      |       |

## Product Sustainability

AFC Cladding is committed to providing the highest quality high density compressed fiber cement panels to the U.S. building markets. In order to do this, we feel it necessary to provide not only high quality products, but sustainable products that can contribute to green (LEED) building projects, which in turn benefit the environment we all live in.

AFC Cladding products currently have a potential contribution to various LEED credits including but not limited to:

### Direct Contribution

#### Materials and Resources:

- ◆ BPDO – Environmental Product Declarations

### Indirect Contribution

#### Indoor Environmental Quality:

- ◆ Thermal Comfort

### Energy and Atmosphere:

- ◆ Optimize Energy Performance

One of the most important sustainable attributes is the durability of AFC Cladding panels. With their long lifespan, virtually requiring no refurbishment, AFC Cladding panels can contribute to less replacement of materials and to drastically lower maintenance costs over the useful life of the building.

The Ventilated and Insulated Rainscreen Cladding (VIRSC) system, which is used to affix AFC Cladding panels to the exterior of a structure, offers many benefits and green attributes to the performance of the building envelope. Durability and resistance to moisture and mold build-up are noteworthy benefits. Equally important is its ability to accommodate external insulation.

In addition, AFC Cladding is dedicated to further research and analysis of our products to achieve additional LEED credits, and help further the cause of building sustainable and efficient buildings.

Warranty information available upon request.



## Fiber Cement— Distinct Properties

**Sound and Weather Resistant** — Cembrit fiber cement boards deliver optimal sound and weather insulation. Noise as well as changing weather conditions such as freeze/thaw, heat and water pose no threat to fiber cement façades. The boards retain their shape at all times.

**Low Maintenance** — The ability of the boards to resist mold and algae attacks is equally impressive. The result is a long-lived façade that saves you time and effort on inconvenient and costly repairs and repaints.

**Non-combustible** — The boards are non-combustible, which is your guarantee for a safe building.

**Easy Handling** — Cembrit fiber cement boards are flexible and easy to handle. They can be delivered cut to size, ready for installation. All this makes for lower construction costs, shorter construction times, and lower installed costs.

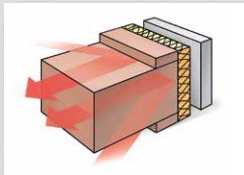
## Fiber Cement— A Unique Composition

**Natural Ingredients** — With the strong composition of cement, mineral fillers, cellulose and non-toxic, organic fibers— and not to forget a dash of water— Cembrit fiber cement boards are made up of purely natural and environmentally friendly raw materials. This makes for sustainable and fully reusable boards.

**Strong Recipe** — The secret behind the impressive strength and durability of Cembrit fiber cement boards resides in the manufacturing technology. Thin layers of fiber cement are added on top of each other, pressed firmly together under tremendous pressure before completing a slow air curing process. Reinforced by carefully selected fibers, the many thin layers give the fiber cement cladding a strength with few peers in the world of building materials.

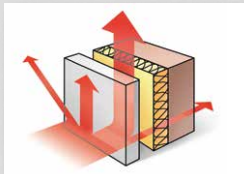
**Green Footprints** — A comprehensive analysis of the environmental impact of the Cembrit boards can be made from Cembrit's EPDs in accordance with EN 15804 on the Sustainability of Construction Works. The EPDs provide a Life-Cycle Assessment, manufacturing process details, and information on the use of any dangerous materials. These EPDs are available online.

## Rainscreen Cladding



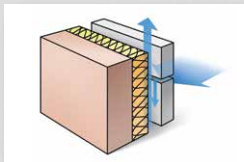
### Preventing thermal bridges

As the insulating material is on the outside of the structural wall, it can easily be mounted without interruptions caused by floor slabs. In this way, any thermal bridges that occur at each floor slab can be prevented. These thermal bridges are also the cause of surface condensation that may result in fungus growth.



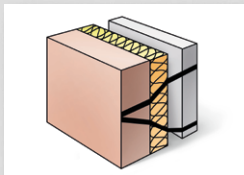
### Dissipating heat from the sun

The ventilated rainscreen cladding system has a cooling effect when temperatures outside are high. Most of the sun's rays are reflected away from the building. Heat passing through the exterior wall panel is partially dissipated by the ventilating effect of the space between the exterior cladding panel and the structural wall. Any residual heat managing to penetrate buildings is very minor.



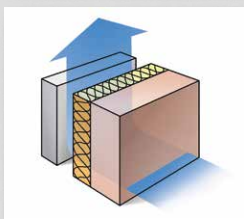
### Rainscreen

Architectural wall-cladding panels act as a rainscreen on the outside of the building and keep the structural wall absolutely dry. The air space connected to the outside air evacuates water and humidity that might have penetrated behind the wall-cladding panels through its horizontal or vertical joints. This water will never reach the load bearing wall and/or the thermal insulation.



### Protecting the basic structure and load-bearing wall against temperature variations

In view of the fact that the insulation material is applied to the outside of the building, changes in temperature are very minor compared with those found in conventional constructions where insulation is applied on the interior. This principle works in summer and winter in both hot and cold climates.



### Prevention of internal condensation

Insulation material can be applied to the outside of the structural wall because it is protected effectively by the architectural exterior wall panel. Because of differences in vapor pressure and temperature passing through the wall, condensation has been shown to occur close to the ventilated area and not in the structural wall itself. As a result, the ventilating effect is easily sufficient to dry out the thermal insulating material.

Distributed exclusively by



**American Fiber  
Cement Corporation**

6901 South Pierce Street, Suite 180  
Littleton, CO 80128 U.S.A.

Phone: 303-972-5107  
Fax: 303-978-0308

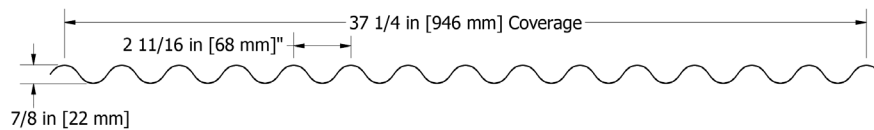
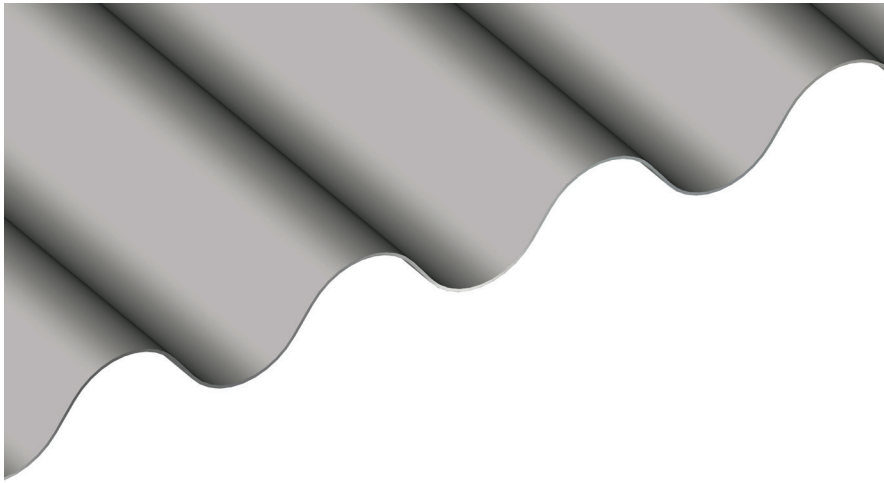
[www.americanfibercement.com](http://www.americanfibercement.com)

**CEMBRIT**

Building Better Days



**ATA  
Continuing  
Education  
Provider**



## CORRUGATED PANEL

SKU: BWC374

### MATERIAL

.032, .040, .050 aluminum

24, 22\*, 20\* ga. metallic coated steel

24, 22\*, 20\* ga. 55% Al-Zn alloy coated steel with acrylic coating

16, 20 oz. copper\*\*

.8, 1.0, 1.2 mm zinc\*\*

\*Inquire for available panel widths

### PANEL SPECS

Coverage: 37 1/4"

Minimum Length: 6'-0"

Depth: 7/8"

### AVAILABLE

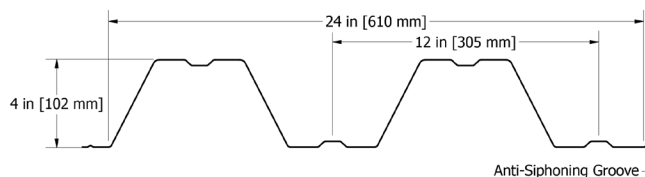
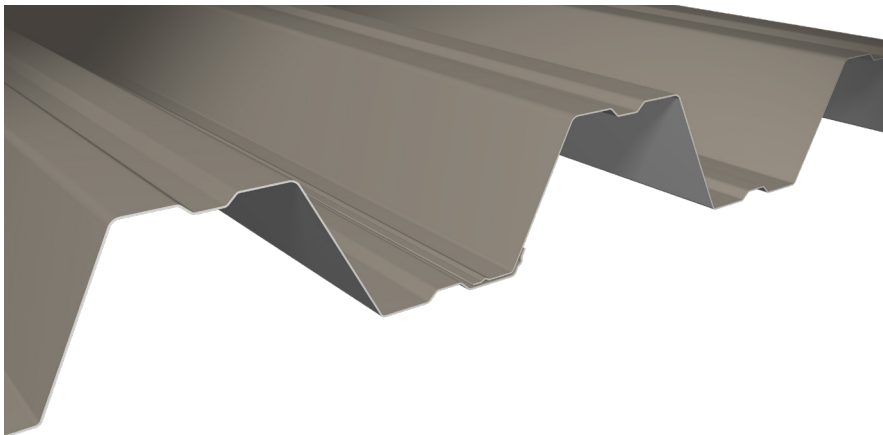
Crimp-Curving (convex and concave)

Stretch Curving

### TEXTURE

Smooth or Stucco Embossed

 [www.atas.com/corrugated](http://www.atas.com/corrugated)



## SPAN WALL™

SKU: BWS240

### MATERIAL

.032, .040, .050 aluminum

24, 22\*, 20, 18 ga. metallic coated steel

24, 22\*, 20\*, 18\* ga. 55% Al-Zn alloy coated steel with acrylic coating

.8, 1.0 mm zinc\*

16, 20 oz. copper\*

### PANEL SPECS

Coverage: 24"

Minimum Length: 6'-0"

Depth: 4"

### AVAILABLE

Crimp-Curving (convex and concave)

### TEXTURE

Smooth or Stucco Embossed

 [www.atas.com/spanwall](http://www.atas.com/spanwall)





# ATAS International, Inc.

Sustainable Building Envelope Technology



STOCK • MATTE • PREMIUM • NATURAL  
WOODLAND • OXIDE • LAMINATE

## COLOR CHART

A leading manufacturer of sustainable building envelope technology, ATAS utilizes cool pigment paint on many color offerings. Our products reflect infrared radiation, which results in cooler surface temperatures, and maximum fade resistance.

Many of the ATAS products meet the qualifications for potential green building certification credits and industry ratings. See ATAS website for specific SRI values ([www.atas.com/sri](http://www.atas.com/sri)). Information on ATAS' sustainable products can be found at [www.atas.com/sustainability](http://www.atas.com/sustainability).

70% PVDF finish carries a limited warranty against fading and chalking. ATAS coated materials are non-staining and virtually maintenance free. Any surface residue is easily removed with conventional cleaning solutions or detergents.



## STOCK COLORS

70% PVDF resin based coatings provide high-performance durability for exterior and interior applications. These coatings are designed to resist fading, chalking, and abrasion. Meets the requirement of AAMA 2605-13 for aluminum substrates.



Black (02)



Classic Bronze (01)



Medium Bronze (03)



Hartford Green (27)



Forest Green (11)



Teal (19)



Hemlock Green (30)



Patina Green (12)



Chocolate Brown (04)



Boysenberry (25)



Redwood (07)



Mission Red (08)



Sierra Tan (09)



Rawhide (15)



Concord Cream (05)



Sandstone (06)



Regal Blue (18)



Slate Blue (21)



Siam Blue (14)



Rocky Grey (16)



Charcoal Grey (62)



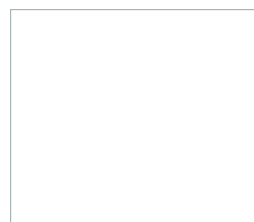
Slate Grey (20)



Dove Grey (13)



Ascot White (10)



Bone White (26)



[www.atas.com/colors](http://www.atas.com/colors)

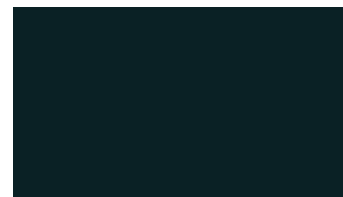


## MATTE FINISH

Designed to simulate natural metal hues in a high-performance 70% PVDF paint system.



Matte Black (32)



Char Brown (29)



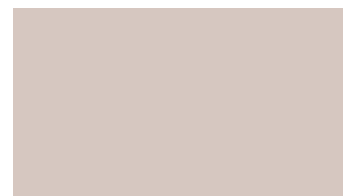
Thunder Grey (34)



Anchor Grey (37)



Ash Grey (33)



Almond (36)

## PREMIUM FINISH

70% PVDF resin based coatings, with premium pigmentation to obtain metallic or deep color for desired aesthetics.



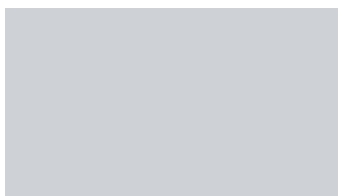
Antique Patina (24)



Champagne (31)



Coppertone (23)



Titanium (35)



Silversmith (28)



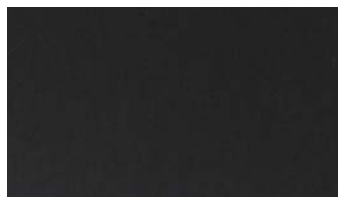
Brite Red (17)

## NATURAL METALS

Natural metals will weather and patina naturally over time, adding character and aesthetic appeal to any building design. In addition to natural metals, ATAS offers 55% Al-Zn alloy coated steel with acrylic coating and anodized aluminum as standard available materials.



Grey Zinc (50)\*



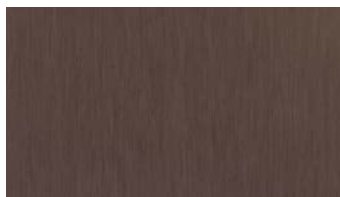
Dark Zinc (51)\*



Brown Zinc (89)\*



Blue Zinc (94)\*



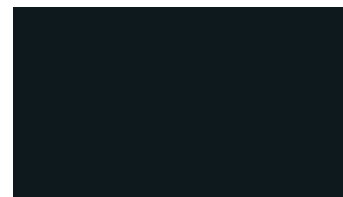
Red Zinc (95)\*



Green Zinc (96)\*



Clear Satin Anodized (70)



Dark Bronze Anodized (71)



55% Al-Zn Alloy Coated Steel with Acrylic Coating (97)



Copper (49)\*



Classic Stainless Steel (40)\*



Tin Matte Stainless Steel (41)\*

\*Special material. Pricing and availability dependent upon project specifics. Color chips available upon request.

## WOODLAND SERIES

Add the warmth of wood with the durability of metal to your next project. ATAS offers four classic woodgrain patterns with a 70% PVDF coating. The Woodland Series is available in .032 aluminum.



Birch (57)



Cedar (54)



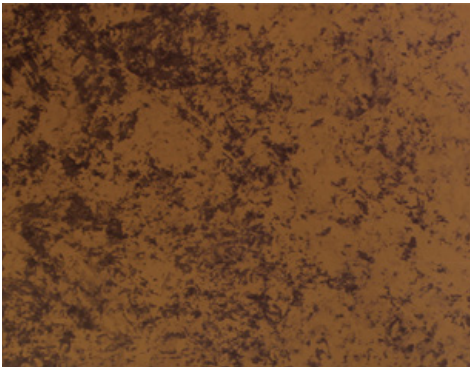
Driftwood (53)



Walnut (55)

## OXIDE SERIES

Made to look like weathered steel with a rust-like appearance, these color choices add a timeless appearance with a 70% PVDF finish to your project.



Copper Brown (42)



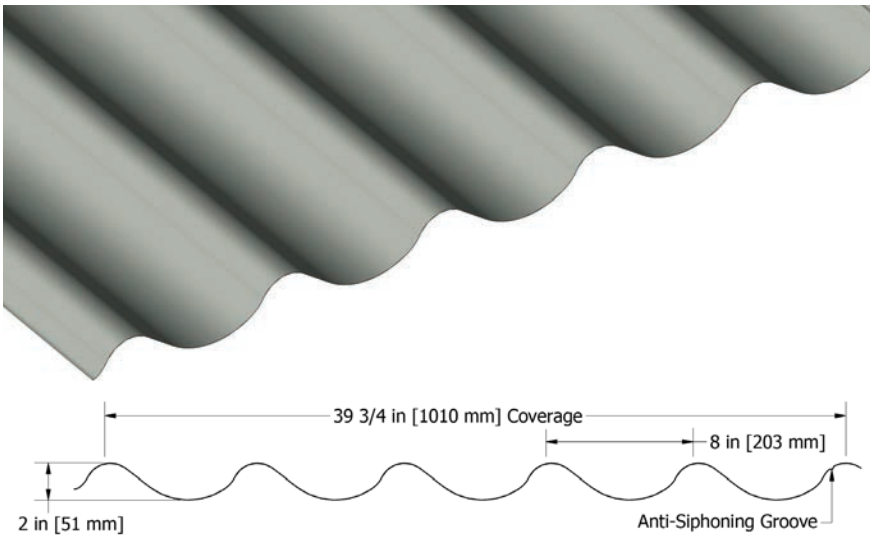
Tarnished Red (47)

## LAMINATE

ATAS offers a stacked stone pattern stocked in .032 aluminum in 50" width. It is UV stable for exterior application.



Stacked Stone (85)



## WAVE PANEL

SKU: BWW400

### MATERIAL

.032, .040, .050 aluminum,  
22\* ga. metallic coated steel

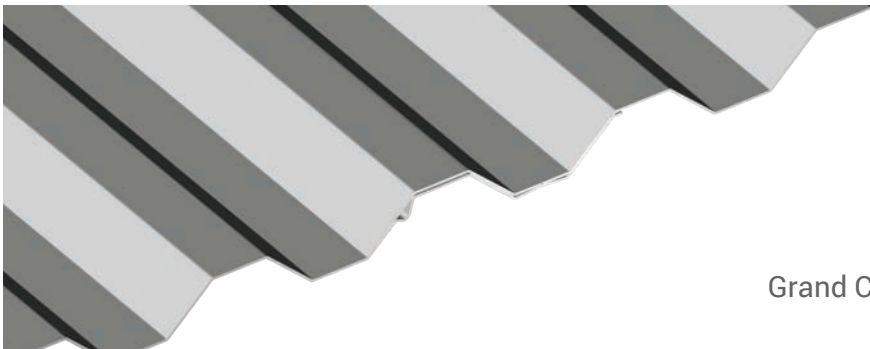
### PANEL SPECS

Coverage: 39<sup>3</sup>/<sub>4</sub>"  
Minimum Length: 1'-6<sup>1</sup>/<sub>2</sub>"  
Depth: 2"

### TEXTURE

Smooth or Stucco Embossed

[www.atas.com/wavepanel](http://www.atas.com/wavepanel)



Grand C



Grand V

## GRAND C & GRAND V

SKU: BWF324 (Grand C),  
BWW320 (Grand V)

### MATERIAL

.032 aluminum

### PANEL SPECS

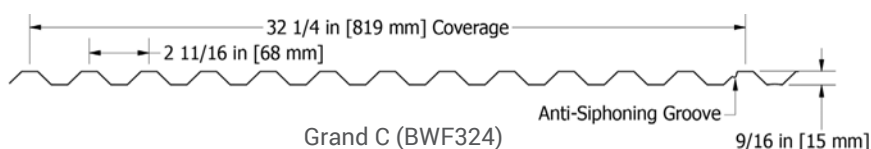
Coverage:  
32<sup>1</sup>/<sub>4</sub>" (Grand C),  
32" (Grand V)  
Minimum Length: 6'-0"  
Depth:  
9/16" (Grand C),  
1/2" (Grand V)

### TEXTURE

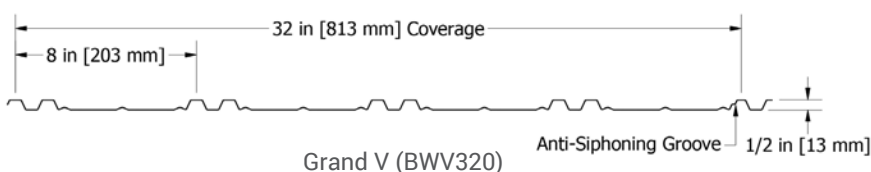
Smooth

[www.atas.com/grandc](http://www.atas.com/grandc)

[www.atas.com/grandv](http://www.atas.com/grandv)



Grand C (BWF324)



Grand V (BWW320)





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WOODLAND • OXIDE • LAMINATE

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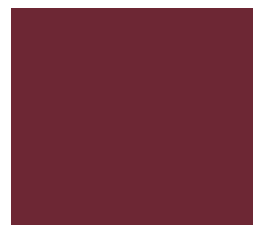
Patina Green (12)



Chocolate Brown (04)



Boysenberry (25)



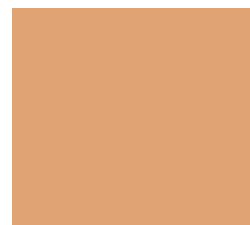
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Sierra Tan (09)



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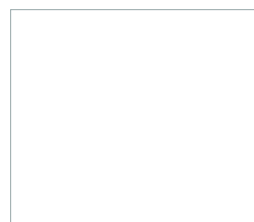
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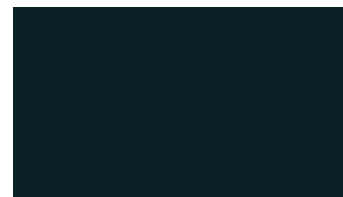
[www.atas.com/colors](http://www.atas.com/colors)

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Matte Black (32)



Char Brown (29)



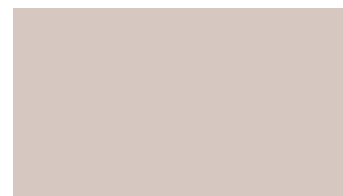
Thunder Grey (34)



Anchor Grey (37)



Ash Grey (33)



Almond (36)

## PREMIUM FINISH

70% PVDF resin based coatings, with premium pigmentation to obtain metallic or deep color for desired aesthetics.



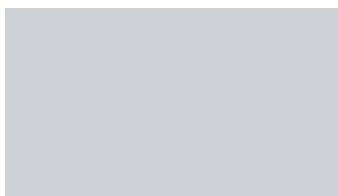
Antique Patina (24)



Champagne (31)



Coppertone (23)



Titanium (35)



Silversmith (28)



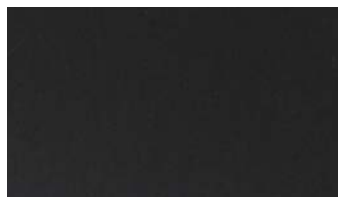
Brite Red (17)

## NATURAL METALS

Natural metals will weather and patina naturally over time, adding character and aesthetic appeal to any building design. In addition to natural metals, ATAS offers 55% Al-Zn alloy coated steel with acrylic coating and anodized aluminum as standard available materials.



Grey Zinc (50)\*



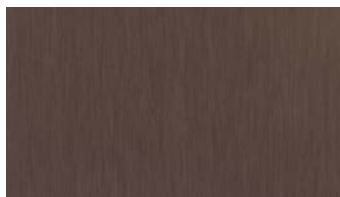
Dark Zinc (51)\*



Brown Zinc (89)\*



Blue Zinc (94)\*



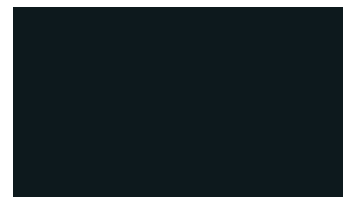
Red Zinc (95)\*



Green Zinc (96)\*



Clear Satin Anodized (70)



Dark Bronze Anodized (71)



55% Al-Zn Alloy Coated Steel with Acrylic Coating (97)



Copper (49)\*



Classic Stainless Steel (40)\*



Tin Matte Stainless Steel (41)\*

\*Special material. Pricing and availability dependent upon project specifics. Color chips available upon request.

## WOODLAND SERIES

Add the warmth of wood with the durability of metal to your next project. ATAS offers four classic woodgrain patterns with a 70% PVDF coating. The Woodland Series is available in .032 aluminum.



Birch (57)



Cedar (54)



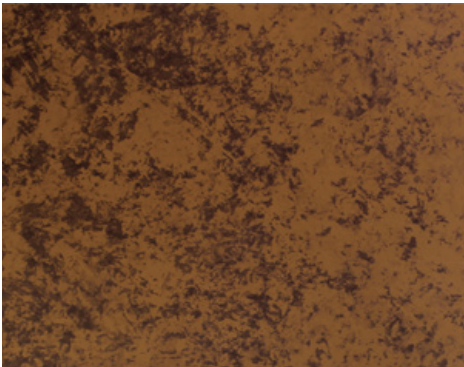
Driftwood (53)



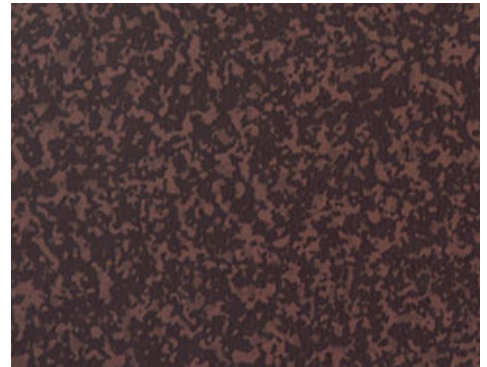
Walnut (55)

## OXIDE SERIES

Made to look like weathered steel with a rust-like appearance, these color choices add a timeless appearance with a 70% PVDF finish to your project.



Copper Brown (42)



Tarnished Red (47)

## LAMINATE

ATAS offers a stacked stone pattern stocked in .032 aluminum in 50" width. It is UV stable for exterior application.



Stacked Stone (85)

[www.atas.com](http://www.atas.com) | ATAS International, Inc.  
800.468.1441 | Allentown, PA | Mesa, AZ

Stainless steel products provided by ROOFINOX®. Colors are as close to the actual colors as modern printing allows. Exact metal color chips available upon request (this is a requirement for all premium colors), and should be used for final color selection. If you have requirements or preference for colors or finishes other than shown, contact ATAS. Color availability varies by material, gauge and profile. ATAS is not responsible for colors selected from color chart. ATAS reserves the right to modify, eliminate and/or change its products without prior notification. All colors are produced under stringent guidelines and tolerances that are identified within the coated metal industry. Batch to batch variations may occur within these established industry tolerances. Care should be exercised by customer when mixing lots. Contact ATAS for more information. Please visit [www.atas.com](http://www.atas.com) for the most up-to-date information. © 2020 ATAS International, Inc. LRD0121 LAT400





# TruExterior®

Siding & Trim







# So Authentic. So Reliable. Nothing Compares.

TruExterior® Siding & Trim is a true innovation, invented to address issues common with other exterior products in the industry. It's a siding material that offers a high level of dimensional stability to help reduce expansion and contraction. Plus, TruExterior resists water, making it ideal for applications with ground or masonry contact. TruExterior gives builders the freedom to build beautiful homes with confidence.

Pictured: Shiplap, Channel Bevel  
On the Cover: Nickel Gap, Channel











# Phenomenal Performance. Remarkable Workability.

TruExterior® Siding & Trim offers both and a lasting look while eliminating the need for gluing, gapping and other cumbersome and costly installation techniques.

## **APPLICATION**

- Designed for use in non-structural applications
- Suitable for ground and masonry contact
- Can be used in moisture-prone areas
- Installation is the same regardless of the season

## **TOOLS**

- Installed using proven woodworking tools and methods
- Carbide-tipped blades and bits are recommended for a longer tool life

## **FASTENING**

- Accepts common high-quality, exterior-grade fasteners that are suitable for the local environment
- Can be fastened close to the edge
- No need for pre-drilling
- No mushrooming

## **DURABILITY**

- WUI listed
- No need to prime ends or field cuts
- Resists rot and termite attacks\*
- No excessive swelling\*

## **PAINTING**

- TruExterior® products come pre-primed and do require paint
- No need to prime end cuts
- Can be painted with any high-grade exterior paint when following the paint manufacturer's instructions
- Dimensionally stable, promoting long-lasting paint adhesions, even with dark colors\*
- Virtually no moisture cycling, paint lasts longer than on wood\*
- Traditional exterior-grade caulks or exterior-grade wood fillers are all acceptable for filling nail holes

## **BEAUTY**

- Tighter gaps, minimal movement—it will move less than PVC and vinyl
- Truly historically accurate profiles—get the look of traditional, authentic wood profiles
- True look of cedar siding profiles, real architectural detail

## **WARRANTY**

- 20 year limited warranty

\*Please see TruExterior® Siding & Trim Limited Warranties and Product Data Sheets for proprietary test results, located at [TruExterior.com](http://TruExterior.com). Always follow local building codes and construction best practices. See the complete Installation Guidelines for TruExterior® Siding & Trim at [TruExterior.com](http://TruExterior.com).



Pictured: Channel Bevel



Pictured: Nickel Gap



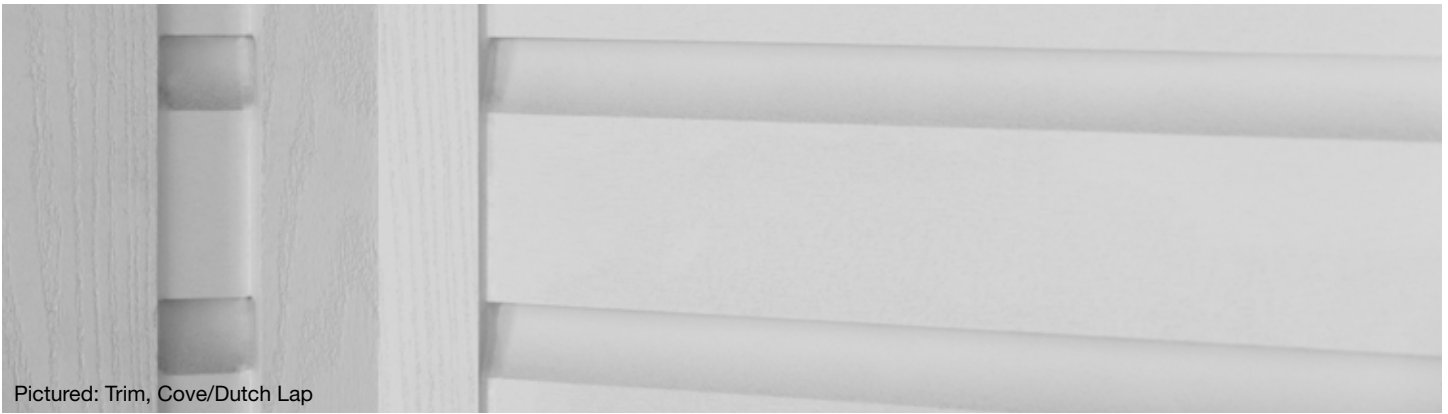
Pictured: Nickel Gap, Trim



Pictured: Channel, Board-and-Batten



Pictured: Nickel Gap, Board-and-Batten



Pictured: Trim, Cove/Dutch Lap



Pictured: Nickel Gap



Pictured: Trim



Pictured: Cove/Dutch Lap





Pictured: Cove/Dutch Lap



# Craftsman Collection™

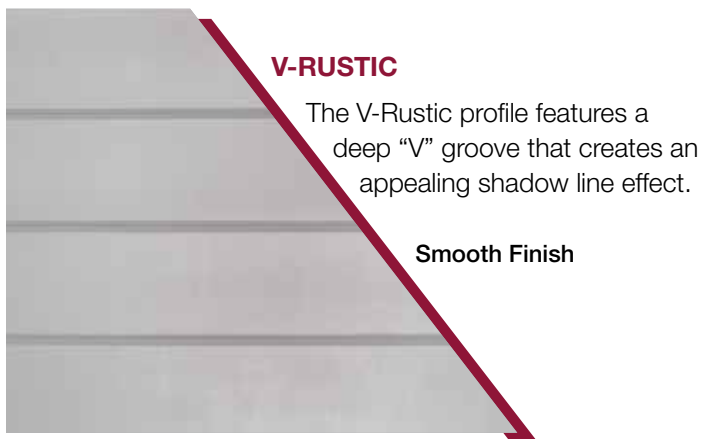
The TruExterior® Siding Craftsman Collection™ offers a variety of authentic, full-thickness profiles with bold, defined shapes and the natural aesthetic of traditional wood siding, all without the maintenance and upkeep associated with exterior wood products.

Historically and architecturally accurate profiles—Channel, Channel Bevel, Cove/Dutch Lap, Nickel Gap, Shiplap and V-Rustic—are the ideal solution for homeowners who desire the look, feel and character of authentic wood siding while avoiding rotting, excessive swelling and termite attacks.

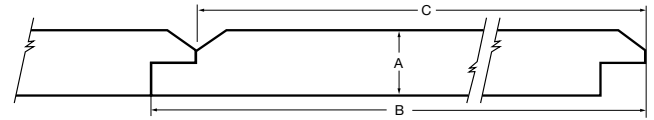


Pictured Top Left to Right: Channel Bevel, Nickel Gap

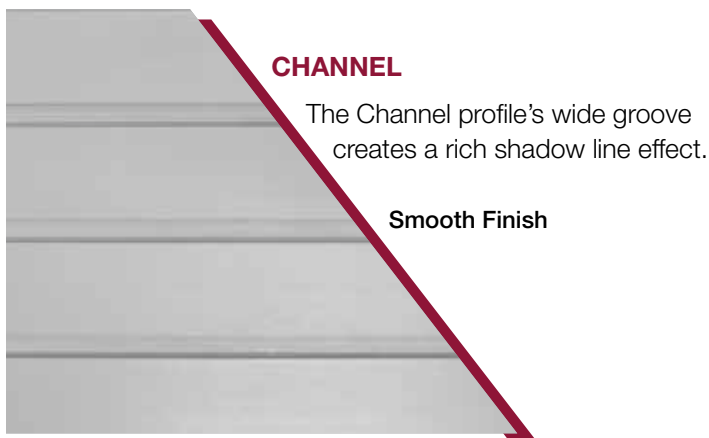
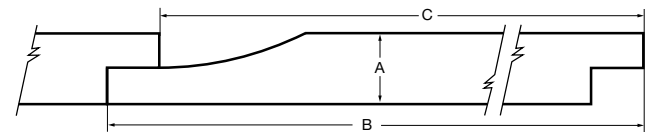
Pictured Bottom Left to Right: Nickel Gap, Channel Bevel



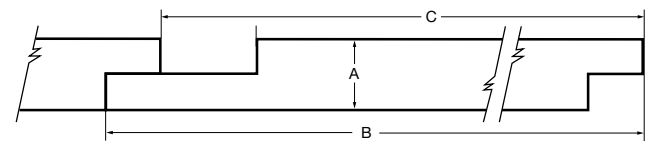
| Nominal Size | Actual Thickness (A) | Actual Width (B) | Reveal (C) |
|--------------|----------------------|------------------|------------|
| 1 x 6        | 11/16"               | 5-1/2"           | 5"         |
| 1 x 8        | 11/16"               | 7-1/2"           | 7"         |
| 1 x 10       | 11/16"               | 9-1/2"           | 9"         |



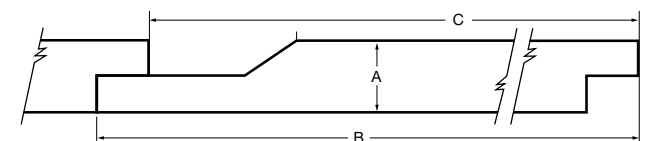
| Nominal Size | Actual Thickness (A) | Actual Width (B) | Reveal (C) |
|--------------|----------------------|------------------|------------|
| 1 x 6        | 11/16"               | 5-1/2"           | 4-31/32"   |
| 1 x 8        | 11/16"               | 7-1/4"           | 6-23/32"   |
| 1 x 10       | 11/16"               | 9-1/4"           | 8-23/32"   |



| Nominal Size | Actual Thickness (A) | Actual Width (B) | Reveal (C) |
|--------------|----------------------|------------------|------------|
| 1 x 6        | 11/16"               | 5-1/2"           | 4-31/32"   |
| 1 x 8        | 11/16"               | 7-1/4"           | 6-23/32"   |
| 1 x 10       | 11/16"               | 9-1/4"           | 8-23/32"   |



| Nominal Size | Actual Thickness (A) | Actual Width (B) | Reveal (C) |
|--------------|----------------------|------------------|------------|
| 1 x 6        | 11/16"               | 5-1/2"           | 4-31/32"   |
| 1 x 8        | 11/16"               | 7-1/2"           | 6-31/32"   |
| 1 x 10       | 11/16"               | 9-1/2"           | 8-31/32"   |



*TruExterior Siding comes pre-primed and does require paint.*



REVERSIBLE SHIPLAP-NICKEL GAP

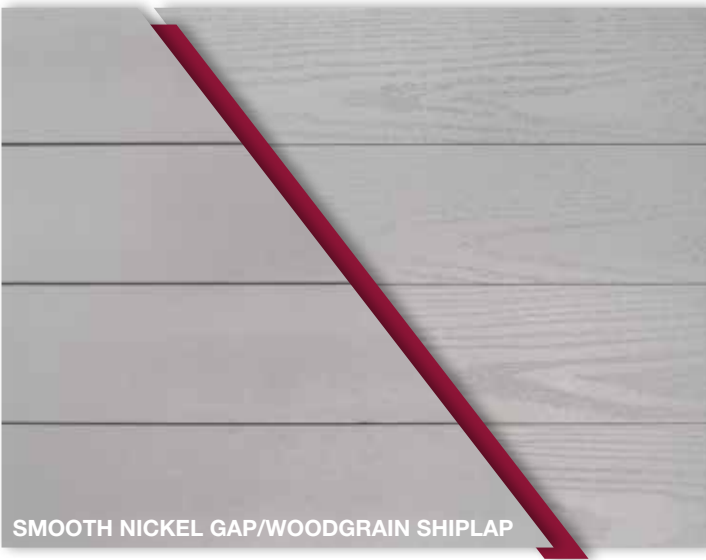
TruExterior Siding & Trim’s Reversible Shiplap/Nickel Gap siding panels offer two authentic, on-trend looks in one for increased versatility and convenience. The profile comes in two formats: one features smooth Nickel Gap on one side and woodgrain Shiplap on the other; the second combines woodgrain Nickel Gap with smooth Shiplap on the flip side. A rabbeted edge ensures panels install with authentic spacing depending on which side is installed—the tight joint appearance of Shiplap or the nickel-sized space of Nickel Gap. Four widths are available for 16 total profile combinations.

Finish Options:

- Smooth Nickel Gap with Woodgrain Shiplap
- Woodgrain Nickel Gap with Smooth Shiplap



Pictured: Smooth Nickel Gap



SMOOTH NICKEL GAP/WOODGRAIN SHIPLAP



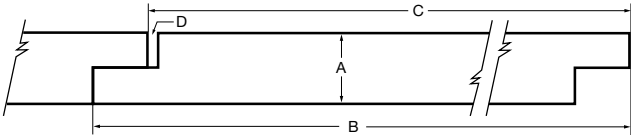
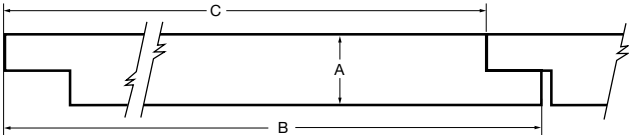
WOODGRAIN NICKEL GAP/SMOOTH SHIPLAP

SHIPLAP GAP SIDE

| Nominal Size | Actual Thickness (A) | Actual Width (B) | Reveal (C) |
|--------------|----------------------|------------------|------------|
| 1 x 4        | 11/16"               | 3-1/2"           | 3-3/32"    |
| 1 x 6        | 11/16"               | 5-1/2"           | 5-3/32"    |
| 1 x 8        | 11/16"               | 7-1/4"           | 6-13/16"   |
| 1 x 10       | 11/16"               | 9-1/4"           | 8-13/16"   |

NICKEL GAP SIDE

| Nominal Size | Actual Thickness (A) | Actual Width (B) | Reveal (C) | Gap (D) |
|--------------|----------------------|------------------|------------|---------|
| 1 x 4        | 11/16"               | 3-1/2"           | 3-3/32"    | 5/64"   |
| 1 x 6        | 11/16"               | 5-1/2"           | 5-3/32"    | 5/64"   |
| 1 x 8        | 11/16"               | 7-1/4"           | 6-13/16"   | 5/64"   |
| 1 x 10       | 11/16"               | 9-1/4"           | 8-13/16"   | 5/64"   |



TruExterior Siding comes pre-primed and does require paint.



# Beadboard

Including single and double profiles, TruExterior® Beadboard is ideal for porch ceilings, soffits and decorative wall applications, and allows for a variety of installations, as it can be attached in either parallel or perpendicular directions.

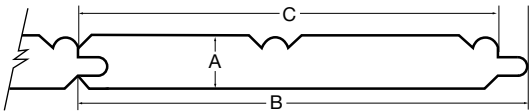
Its “tongue-and-groove” design results in a clean look that can be reversed to offer a contemporary “V-groove” appearance.





Pictured: Beaded Pattern

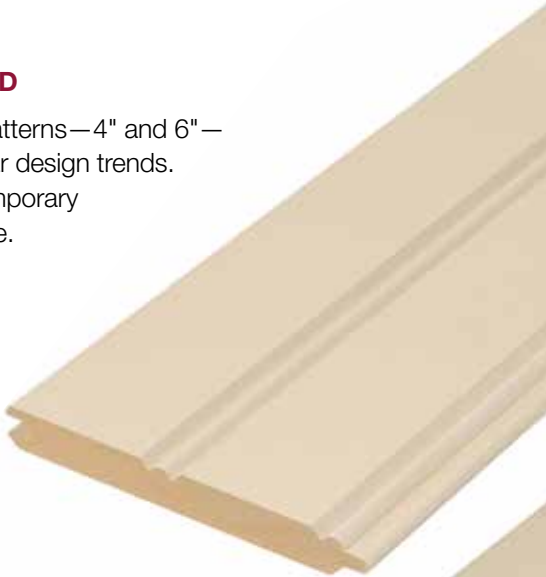
| Nominal Size | Actual Thickness (A) | Actual Width (B) | Reveal (C) |
|--------------|----------------------|------------------|------------|
| 5/8 x 4      | 5/8"                 | 3-15/32"         | 3-5/32"    |
| 5/8 x 6      | 5/8"                 | 5-5/16"          | 4-15/16"   |



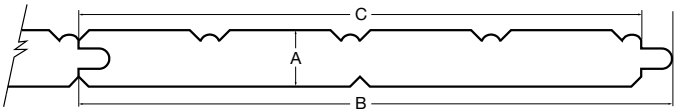
### SINGLE BEADBOARD

Two distinct beaded patterns—4" and 6"—to suit the most popular design trends. Reversible for a contemporary “V-Groove” appearance.

**Smooth Finish**



| Nominal Size | Actual Thickness (A) | Actual Width (B) | Reveal (C) |
|--------------|----------------------|------------------|------------|
| 5/8 x 8      | 5/8"                 | 6-9/16"          | 6-7/32"    |
| 5/8 x 12     | 5/8"                 | 10-1/4"          | 9-29/32"   |



### DOUBLE BEADBOARD

The same appearance as the single-profile products, but with twice the coverage. Reversible for a contemporary “V-Groove” appearance.

**Smooth Finish**



*TruExterior Beadboard comes pre-primed and does require paint.*



# Trim

Designed to be used in non-load-bearing applications, TruExterior® Trim is suitable for ground and masonry contact and moisture-prone areas, which makes it ideal for exterior trim applications such as fascia, door trim, soffits, rake boards and a variety of other applications. There is no need to prime ends or field cuts. Plus, it can be painted any color. TruExterior® Trim accepts common high-quality, exterior-grade fasteners and can be installed using standard woodworking tools and methods.





| 5/8 Trim Sizes |                | 1X Trim Sizes |                | 5/4 Trim Sizes |              | 2X Trim Sizes |                  |
|----------------|----------------|---------------|----------------|----------------|--------------|---------------|------------------|
| Nominal        | Actual         | Nominal       | Actual         | Nominal        | Actual       | Nominal       | Actual           |
| —              | —              | —             | —              | —              | —            | 2 x 2         | 1-1/2" x 1-1/2"  |
| —              | —              | 1 x 3         | 3/4" x 2-1/2"  | 5/4 x 3        | 1" x 2-1/2"  | —             | —                |
| 5/8 x 4        | 5/8" x 3-1/2"  | 1 x 4         | 3/4" x 3-1/2"  | 5/4 x 4        | 1" x 3-1/2"  | 2 x 4         | 1-1/2" x 3-1/2"  |
| —              | —              | 1 x 5         | 3/4" x 4-1/2"  | 5/4 x 5        | 1" x 4-1/2"  | —             | —                |
| 5/8 x 6        | 5/8" x 5-1/2"  | 1 x 6         | 3/4" x 5-1/2"  | 5/4 x 6        | 1" x 5-1/2"  | 2 x 6         | 1-1/2" x 5-1/2"  |
| 5/8 x 8        | 5/8" x 7-1/4"  | 1 x 8         | 3/4" x 7-1/4"  | 5/4 x 8        | 1" x 7-1/4"  | 2 x 8         | 1-1/2" x 7-1/4"  |
| 5/8 x 10       | 5/8" x 9-1/4"  | 1 x 10        | 3/4" x 9-1/4"  | 5/4 x 10       | 1" x 9-1/4"  | 2 x 10        | 1-1/2" x 9-1/4"  |
| 5/8 x 12       | 5/8" x 11-1/4" | 1 x 12        | 3/4" x 11-1/4" | 5/4 x 12       | 1" x 11-1/4" | 2 x 12        | 1-1/2" x 11-1/4" |

TruExterior® Trim is reversible with woodgrain on one side and a smooth finish on the reverse. Available in a 16' length.

**Reversible Smooth/Woodgrain Finish**

### BOARD-AND-BATTEN SIDING

Whether a Modern Farmhouse design or creating accents on a gable, board-and-batten is one of the hottest trends in home exterior design. And it's easy to create the board-and-batten look using just TruExterior Trim.



*TruExterior Trim comes pre-primed and does require paint.*

# Accessories

TruExterior® Siding & Trim Accessories make it easy to create polished, professional-looking siding and trim installations. Decorative yet functional, the poly-ash accessories are designed to go where other materials can't, making them the perfect complement to cedar, fiber cement and other traditional siding products, as they are suitable for ground and masonry contact.



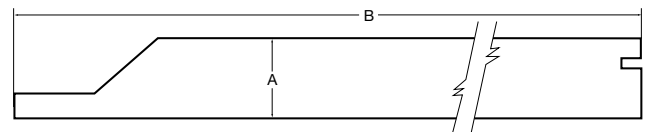
## SKIRT BOARD

Provides a decorative yet functional way to create the required clearance between siding and grade.

### Available Finishes:

- Smooth
- Woodgrain

| Nominal Size | Actual Thickness (A) | Actual Width (B) |
|--------------|----------------------|------------------|
| 1 x 6        | 3/4"                 | 5-1/2"           |
| 1 x 8        | 3/4"                 | 7-1/4"           |
| 5/4 x 6      | 1"                   | 5-1/2"           |
| 5/4 x 8      | 1"                   | 7-1/4"           |



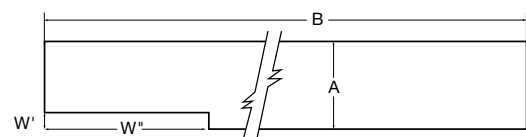
## WINDOW POCKET RABBETED TRIM

The rabbeted groove helps trim to sit flush over the window's nailing flange, eliminating the need for cuts or shims.

### Available Finishes:

- Smooth
- Woodgrain

| Nominal Size | Actual Thickness (A) | Actual Width (B) | Window Pocket (W' x W'') |
|--------------|----------------------|------------------|--------------------------|
| 5/4 x 4      | 1"                   | 3-1/2"           | 3/16" x 1-7/8"           |
| 5/4 x 6      | 1"                   | 5-1/2"           | 3/16" x 1-7/8"           |
| 5/4 x 8      | 1"                   | 7-1/4"           | 3/16" x 1-7/8"           |

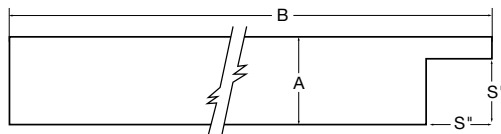


*TruExterior Accessories come pre-primed and do require paint.*





| Nominal Size | Actual Thickness (A) | Actual Width (B) | Siding Pocket (S' x S'') |
|--------------|----------------------|------------------|--------------------------|
| 5/4 x 3      | 1"                   | 2-1/2"           | 3/4" x 3/4"              |
| 5/4 x 4      | 1"                   | 3-1/2"           | 3/4" x 3/4"              |
| 5/4 x 5      | 1"                   | 4-1/2"           | 3/4" x 3/4"              |
| 5/4 x 6      | 1"                   | 5-1/2"           | 3/4" x 3/4"              |
| 5/4 x 8      | 1"                   | 7-1/4"           | 3/4" x 3/4"              |



### SIDING POCKET RABBETED TRIM

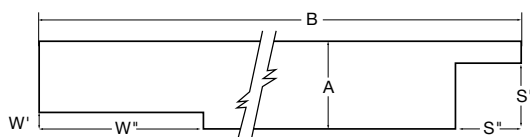
Perfect for end wall terminations, this trim with a 3/4" siding pocket accepts all TruExterior® Siding profiles.

#### Available Finishes:

- Smooth
- Woodgrain



| Nominal Size | Actual Thickness (A) | Actual Width (B) | Window Pocket (W' x W'') | Siding Pocket (S' x S'') |
|--------------|----------------------|------------------|--------------------------|--------------------------|
| 5/4 x 4      | 1"                   | 3-1/2"           | 3/16" x 1-7/8"           | 3/4" x 3/4"              |
| 5/4 x 6      | 1"                   | 5-1/2"           | 3/16" x 1-7/8"           | 3/4" x 3/4"              |
| 5/4 x 8      | 1"                   | 7-1/4"           | 3/16" x 1-7/8"           | 3/4" x 3/4"              |

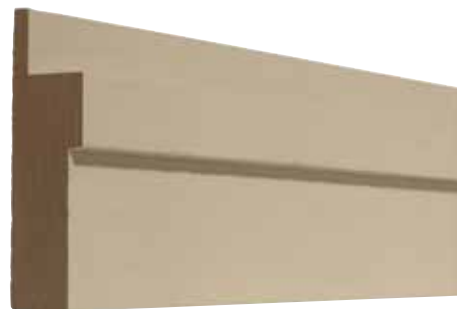


### WINDOW AND SIDING POCKET RABBETED TRIM

The ultimate accessory to build a neat, professional-looking window surround.

#### Available Finishes:

- Smooth
- Woodgrain



*TruExterior Accessories come pre-primed and do require paint.*

# TruExterior® Siding & Trim Reference Guide

## SUSTAINABILITY

The sustainable properties of TruExterior® Siding & Trim are a result of a combination of proprietary polymer chemistry and highly refined, recovered coal combustion products (fly ash), which are endorsed by the U.S. Green Building Council (USGBC) for use in construction materials.

- Contains a minimum of 70% recycled content—verified by SCS Global Services



## CODE LISTINGS

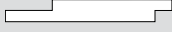
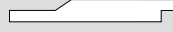
TruExterior® Siding & Trim have undergone rigorous internal and third-party testing to provide building officials, architects, contractors, specifiers, designers and others with reliable, high-performing products.

- California's Wildland-Urban Interface (WUI) listed—Beadboard, Siding, and Trim
- Texas Department of Insurance (TDI) EC-92—Siding
- Florida Building Code FL17285—Siding
- Intertek CCRR-0300

## PROJECT ESTIMATOR

| V-Rustic                                                                            |                   | Cove/Dutch Lap                                                                        |                   |
|-------------------------------------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------|-------------------|
|  |                   |  |                   |
| Nominal                                                                             | Boards per square | Nominal                                                                               | Boards per square |
| 1 x 6                                                                               | 15                | 1 x 6                                                                                 | 15                |
| 1 x 8                                                                               | 11                | 1 x 8                                                                                 | 12                |
| 1 x 10                                                                              | 9                 | 1 x 10                                                                                | 9                 |

| Channel                                                                             |                   | Channel Bevel                                                                         |                   |
|-------------------------------------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------|-------------------|
|  |                   |  |                   |
| Nominal                                                                             | Boards per square | Nominal                                                                               | Boards per square |
| 1 x 6                                                                               | 15                | 1 x 6                                                                                 | 15                |
| 1 x 8                                                                               | 12                | 1 x 8                                                                                 | 11                |
| 1 x 10                                                                              | 9                 | 1 x 10                                                                                | 9                 |

| Reversible Shiplap-Nickel Gap                                                       |                   |
|-------------------------------------------------------------------------------------|-------------------|
|  |                   |
| Nominal                                                                             | Boards per square |
| 1 x 4                                                                               | 24                |
| 1 x 6                                                                               | 15                |
| 1 x 8                                                                               | 11                |
| 1 x 10                                                                              | 9                 |



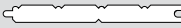
## Craftsman Collection™ Siding

| V-Rustic                                                                          |                 | Cove/Dutch Lap                                                                    |                 | Channel                                                                             |                 |
|-----------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------|-----------------|
|  |                 |  |                 |  |                 |
| Nominal                                                                           | Actual          | Nominal                                                                           | Actual          | Nominal                                                                             | Actual          |
| 1 x 6                                                                             | 11/16" x 5-1/2" | 1 x 6                                                                             | 11/16" x 5-1/2" | 1 x 6                                                                               | 11/16" x 5-1/2" |
| 1 x 8                                                                             | 11/16" x 7-1/2" | 1 x 8                                                                             | 11/16" x 7-1/4" | 1 x 8                                                                               | 11/16" x 7-1/4" |
| 1 x 10                                                                            | 11/16" x 9-1/2" | 1 x 10                                                                            | 11/16" x 9-1/4" | 1 x 10                                                                              | 11/16" x 9-1/4" |

| Channel Bevel                                                                     |                 | Reversible Shiplap-Nickel Gap                                                     |                 |
|-----------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------|-----------------|
|  |                 |  |                 |
| Nominal                                                                           | Actual          | Nominal                                                                           | Actual          |
| 1 x 6                                                                             | 11/16" x 5-1/2" | 1 x 4                                                                             | 11/16" x 3-1/2" |
| 1 x 8                                                                             | 11/16" x 7-1/2" | 1 x 6                                                                             | 11/16" x 5-1/2" |
| 1 x 10                                                                            | 11/16" x 9-1/2" | 1 x 8                                                                             | 11/16" x 7-1/4" |
|                                                                                   |                 | 1 x 10                                                                            | 11/16" x 9-1/4" |

## Beadboard

| Single                                                                            |                 | Double                                                                            |                |
|-----------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------|----------------|
|  |                 |  |                |
| Nominal Size                                                                      | Actual          | Nominal                                                                           | Actual         |
| 5/8 x 4                                                                           | 5/8" x 3-15/32" | 5/8 x 8                                                                           | 5/8" x 6-9/16" |
| 5/8 x 6                                                                           | 5/8" x 5-5/16"  | 5/8 x 12                                                                          | 5/8" x 10-1/4" |

## Trim

| 5/8 Trim Sizes |                | 1X Trim Sizes |                | 5/4 Trim Sizes |              | 2X Trim Sizes |                  |
|----------------|----------------|---------------|----------------|----------------|--------------|---------------|------------------|
| Nominal        | Actual         | Nominal       | Actual         | Nominal        | Actual       | Nominal       | Actual           |
| —              | —              | —             | —              | —              | —            | 2 x 2         | 1-1/2" x 1-1/2"  |
| —              | —              | 1 x 3         | 3/4" x 2-1/2"  | 5/4 x 3        | 1" x 2-1/2"  | —             | —                |
| 5/8 x 4        | 5/8" x 3-1/2"  | 1 x 4         | 3/4" x 3-1/2"  | 5/4 x 4        | 1" x 3-1/2"  | 2 x 4         | 1-1/2" x 3-1/2"  |
| —              | —              | 1 x 5         | 3/4" x 4-1/2"  | 5/4 x 5        | 1" x 4-1/2"  | —             | —                |
| 5/8 x 6        | 5/8" x 5-1/2"  | 1 x 6         | 3/4" x 5-1/2"  | 5/4 x 6        | 1" x 5-1/2"  | 2 x 6         | 1-1/2" x 5-1/2"  |
| 5/8 x 8        | 5/8" x 7-1/4"  | 1 x 8         | 3/4" x 7-1/4"  | 5/4 x 8        | 1" x 7-1/4"  | 2 x 8         | 1-1/2" x 7-1/4"  |
| 5/8 x 10       | 5/8" x 9-1/4"  | 1 x 10        | 3/4" x 9-1/4"  | 5/4 x 10       | 1" x 9-1/4"  | 2 x 10        | 1-1/2" x 9-1/4"  |
| 5/8 x 12       | 5/8" x 11-1/4" | 1 x 12        | 3/4" x 11-1/4" | 5/4 x 12       | 1" x 11-1/4" | 2 x 12        | 1-1/2" x 11-1/4" |

## Accessories

| Skirt Board                                                                         |               | Window Pocket Rabbeted Trim                                                         |             | Siding Pocket Rabbeted Trim                                                          |             | Window and Siding Pocket Rabbeted Trim                                                |             |
|-------------------------------------------------------------------------------------|---------------|-------------------------------------------------------------------------------------|-------------|--------------------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------|-------------|
|  |               |  |             |  |             |  |             |
| Nominal                                                                             | Actual        | Nominal                                                                             | Actual      | Nominal                                                                              | Actual      | Nominal                                                                               | Actual      |
| 1 x 6                                                                               | 3/4" x 5-1/2" | 5/4 x 4                                                                             | 1" x 3-1/2" | 5/4 x 3                                                                              | 1" x 2-1/2" | 5/4 x 4                                                                               | 1" x 3-1/2" |
| 1 x 8                                                                               | 3/4" x 7-1/4" | 5/4 x 6                                                                             | 1" x 5-1/2" | 5/4 x 4                                                                              | 1" x 3-1/2" | 5/4 x 6                                                                               | 1" x 5-1/2" |
| 5/4 x 6                                                                             | 1" x 5-1/2"   | 5/4 x 8                                                                             | 1" x 7-1/4" | 5/4 x 5                                                                              | 1" x 4-1/2" | 5/4 x 8                                                                               | 1" x 7-1/4" |
| 5/4 x 8                                                                             | 1" x 7-1/4"   |                                                                                     |             | 5/4 x 6                                                                              | 1" x 5-1/2" |                                                                                       |             |
|                                                                                     |               |                                                                                     |             | 5/4 x 8                                                                              | 1" x 7-1/4" |                                                                                       |             |

**Note:** All TruExterior® Siding, Trim, Beadboard and Accessory products are available in standard 16' length.



# TruExterior<sup>®</sup>

Siding & Trim

TruExterior.com | 800-521-8486

**Made in the USA**

**Westlake**  
Royal Building Products<sup>™</sup>  
WestlakeRoyalBuildingProducts.com

SIDING & ACCESSORIES  
TRIM & MOULDINGS  
ROOFING  
STONE  
WINDOWS  
OUTDOOR LIVING



# THE ELEMENTS ARE SIMPLE

greenscreen 





Rigid, lightweight panels are 48 inches wide and 6 ft, 8 ft, 10 ft, 12 ft, 14 ft long and can be installed either vertically, horizontally, wall mounted or freestanding.

In addition to the standard panel, the **greenscreen®** system of green facade wall products includes the Column Trellis, customized Crimp-to-Curve shapes, panel trims and a complete selection of engineered attachment solutions. Customization and adaptation to unique project specifications can easily become a part of your **greenscreen®** project. The panels are made from recycled content, galvanized steel wire and finished with a baked on powder coat for durability.

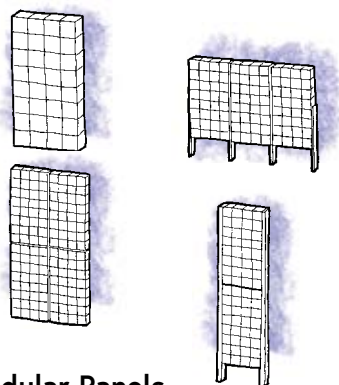




# basic elements

**greenscreen®** is a three-dimensional, welded wire green facade wall system.

The distinctive modular trellis panel is the building block of **greenscreen®**.



## Modular Panels

Use for covering walls, freestanding fences, screens and enclosures.

### Standard Sizes:

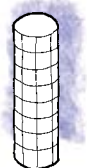
**width:** 48" wide

**length:** 6', 8', 10', 12', 14'

**thickness:** 3" standard

Custom dimensions available in 2" increments, length and width.

See our Accessory Items, Mounting Options and Detail Examples that work together to provide efficient solutions.



## Column Trellis

Use as a vertical freestanding element or as a cover for existing posts. Coiled or flat for easy field installation in standard or custom diameters.

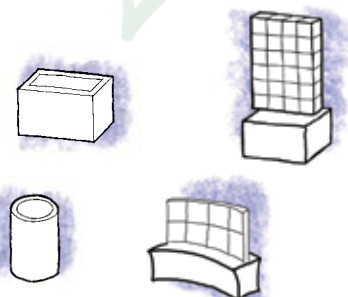
### Standard Sizes:

**dia:** 15½"

**height:** 6', 8', 10', 12', 14'

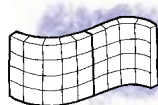
Custom heights in 2" increments

**thickness:** 3" standard



## Planter Options

Planter options are available for a variety of applications and panel heights. Standard 4 ft. wide fiberglass planter units support up to 6' tall screens, and Column planters work with our standard diameter Column Trellis. Our Hedge-A-Matic family of planters use rectangle, curved and square shapes with shorter screens, for venues like patios, restaurants, entries and decks.



## Crimp-to-Curve

Use for curved surfaces, covering walls, freestanding fences, screens, and enclosures.

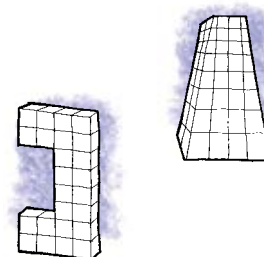
### Standard Sizes:

**radius:** standard radius 4 ft to 12 ft at 12" increments

**length:** Available in 4" increments.

**thickness:** 3"

Custom radius and lengths available. Width variable in 2" increments.



## Custom

Using our basic panel as the building block, we are always available to discuss creative options. Panels can be notched, cut to create a taper, mitered and are available in crimped-to-curve combinations.

## Colors

Our standard powder coated colors are; green, black, silver, bronze, and white. Custom colors are available.



## Accessories

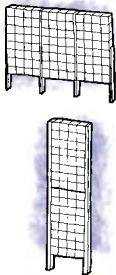
**greenscreen®** is a complete trellis system that includes a versatile array of engineered mounting clips for almost every application of panels and columns. Our trims are factory installed before finishing. All clips, posts and caps are finished to match your project colors. Our Accessory Items list, Mounting Options, Detail Examples and Specifications all work together to provide efficient solutions.



# FREESTANDING

## Freestanding Green Facade Wall or Trellis Fence

When used freestanding, **greenscreen**®'s unique wire truss configuration can span between structural members for use as a security fence, privacy screen, shade element or three-dimensional enclosure. Light in weight, but incredibly strong, **greenscreen**®'s three inch screen depth "captures" plant material and provides the benefits of a living fence or tapestry that can be enjoyed from both sides. Our engineered mounting accessories match the panel finish and easily adapt to posts for simple fence installations or to more complex frameworks for larger multi-story projects. Working with the 2" modular grid simplifies the design process and ensures accurate field installation.







# FREESTANDING

## Standard sizes

width: 4 ft

length: 6 ft

8 ft

10 ft

12 ft

14 ft

thickness: 3" standard

## Custom Sizes

width and length available in  
2" increments up to 4 ft x 14 ft

## Finish

- baked on powder coat finish  
over galvanized steel wire
  - ~ green
  - ~ black
  - ~ silver
  - ~ bronze
  - ~ white
  - ~ custom

## Accessory Options

trim: #5104

#5105

## Mounting Hardware

full range available



# PLANTER

## Size

Rectangular:

4 ft wide x 24" x 30" tall

Cylindrical:

18" dia x 28" tall

Curved:

20" tall x various shapes

## Custom Sizes

custom sizes available

## Finish

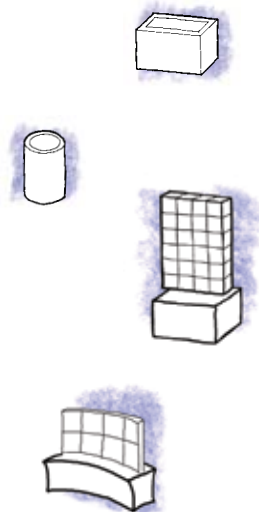
- fiberglass with multiple textures available
- custom color to match client color chip

## Accessory Options:

order with 4 ft wide and 6 ft tall trellis panels for large standard planters. For taller panels additional structure required.

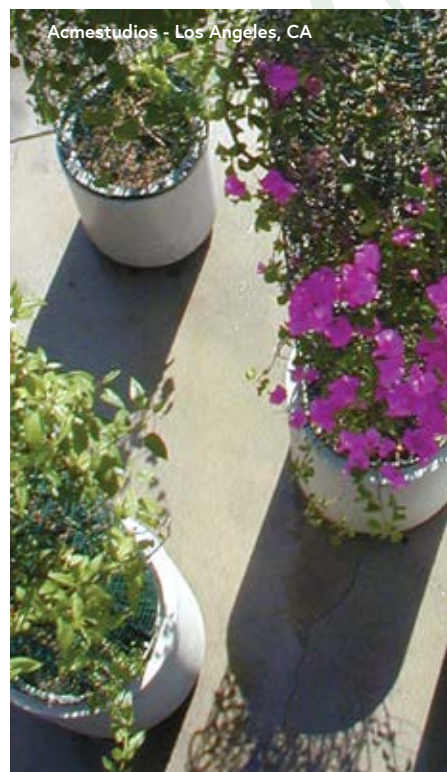
## Mounting Hardware

Planter Straps



## Above Ground Planter

For projects that require containers, **greenscreen®** trellis panels can be mounted to our stationary planters in multiple configurations. Planters may feature special liners and drainage for irrigation control and are available in a variety of colors and finishes. Standard cylindrical planters coordinate with the Column Trellis and flat, modular panels work with rectangular planters. Custom sizes, shapes, and colors can be made to order depending on your project requirements. Curved, straight and square shapes used in combinations are featured in our *Hedge-A-Matic* family of planters, and are available with shorter privacy screens for venues like patios, restaurants, entries and decks.





## project examples

The following pages illustrate some of the many combinations offered with the **greenscreen®** green facade wall system.



Houston Galleria - Houston, TX



Central Park Library - Santa Clara, CA



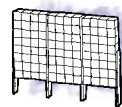
Red Cross - Chicago, IL



Field Blvd - Chicago, IL

The "captive growing space" created by the unique **greenscreen®** panel design promotes vertical plant growth and is an excellent support for maintaining healthy plants. Edge trim can be added at pedestrian areas as a closure strip or at the panel perimeter to provide a reinforced edge for plant maintenance. A variety of colors, finish-matched clips and mounting hardware make it easy to adapt to round or square post systems. **greenscreen®** panels can be mounted vertically or horizontally between posts and are easily integrated into custom gate openings.

## FENCING





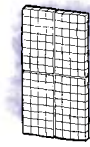


Staten Island Courthouse Parking - NJ



Stanford University Parking Structure #5 - Stanford, CA

## PARKING STRUCTURES



**greenscreen®** trellis panels are a proven solution for providing vertical plant greenery on large multi-story buildings such as parking structures. In a tight building-setback situation, **greenscreen®** requires only a few inches of space to create an effective vertical landscape element. Multi-floor heights can be vegetated from a narrow planting bed that eliminates walkway encroachment or by integrating above grade planters to reach higher elevations. The panels are easily adaptable for new projects or to retro-fit onto existing buildings. The unique panel construction spans between floors and attaches directly to the building face or to a secondary steel frame. In all cases, the three-dimensional depth of the panel promotes rapid, early growth and long term plant support.

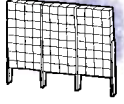


California State University at Fullerton Parking Structure - Fullerton, CA



Renaissance 500 Parking, Ridgeland, MS





**greenscreen®** installations provide security benefits by controlling access without bars or conventional fencing while simultaneously covering the openings with a lacy leaf texture. The three-dimensional panel construction of the **greenscreen®** green facade wall system allows spanning between structural members and can be stacked vertically or horizontally to cover larger areas. The 2" x 2" grid, adaptable clips and brackets make installation simple and efficient.

## SECURITY

Pacific View Mall Parking Structure - Ventura, CA

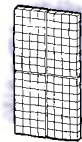


Rolex - Beverly Hills, CA



Vine Street School - Los Angeles CA

## GRAFFITI CONTROL



**greenscreen®** modular wall mounted trellis panels inhibit graffiti action on this 12 foot high parking area wall in a dense urban environment and on a neighborhood school building. A narrow planting bed helps maximize the usable traffic area and the neighborhood enjoys the benefit of a flowering, vine covered solution instead of a monotonous concrete wall. Neighborhood groups and Planning Department officials responded favorably to this alternative.

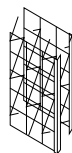
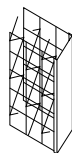


## accessories

*Our Accessory Items list will provide your project with the necessary edge trims, mounting clips, straps, posts, and caps to match your specified finishes with maximum flexibility.*

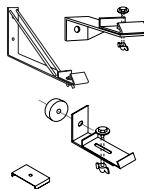
To assist with design and product specification we provide additional details, material specifications, engineering data, complete accessory specifications, BIM and CAD details for inserting into working drawings. Also included is a helpful **Mounting Options** section for use as a guide on typical installations. This additional information is available online at [www.greenscreen.com](http://www.greenscreen.com) and in our Complete Catalog Binder. Contact us for additional materials or with specific questions.

### EDGE TRIMS



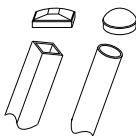
Use as a closure strip at edges of **greenscreen®** panels. Recommended on panel edges adjacent to pedestrian traffic or where edge reinforcement is required for special mounting conditions or long term plant maintenance. #5104 Steel Channel Trim or #5105 Steel Edge Trim can be added to panels in multiple configurations.

### MOUNTING CLIPS



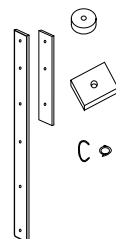
A selection of engineered clips and brackets can be used for a variety of project requirements. Examples are on our website. Please contact a **greenscreen®** Project Manager for more information.

### POSTS AND CAPS



Available in matching finishes and custom lengths.

### STRAPS, SPACERS AND RINGS



Use for attachment to planters, adapting to uneven surfaces, isolating different building materials, aligning screens and joining screens together in a stacking configuration.





## Color Chart

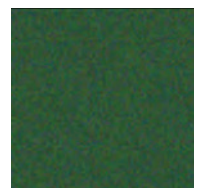
greenscreen® offers six standard colors as well as custom colors. All attachments, posts and custom accessories can be colored to match. Note that color rendering can shift depending on your monitor calibration and viewing conditions. For an exact representation of these colors, sample color chips are available upon request. Visit [greenscreen.com/contact/catalog-samples/](https://greenscreen.com/contact/catalog-samples/).



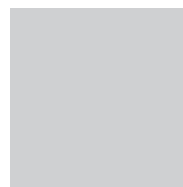
Matte Texture  
Black



White



Matte Texture  
Green



Silver



Bronze



Terra





Studios 5C - Tempe, AZ

CONTACT US  
**greenscreen®**



725 S. Figueroa St.  
Los Angeles, CA 90017  
T - 800.450.3494  
+1 310.837.0526  
F - 310.837.0523  
E - sales@greenscreen.com

[www.greenscreen.com](http://www.greenscreen.com)

At **greenscreen®** we are a team of architects and designers with a broad and deep range of experience in urban planning, landscape design and the construction industry. We consult on both small and large scale projects across the continent and around the world, and we're committed to providing team-oriented design and technical support for your project.

Contact us to discuss **greenscreen®**'s possibilities and its application to your job. We will answer your questions, review drawings, recommend mounting details, prepare shop drawings, provide price quotes and help you place an order.



Spring 2021

Front - Whole Foods, Lincoln Park, IL



# DICHROIC GLASS

## PRODUCT DATA

Dichroic Glass is a mesmerizing reflective surface which selectively filters and reflects different wavelengths of light, depending on the angle of observation. Available in monolithic or laminated form, Dichroic Glass can be combined with complimentary products to create a striking and unique feature piece that will elevate any space with dramatic effects.



### PRODUCT STANDARD OPTIONS\*

| COLOR SHIFTS             | IMAGE                                                                                |
|--------------------------|--------------------------------------------------------------------------------------|
| Gold to Magenta to Green |  |
| Copper to Cyan to Orange |  |



**GOLDRAY**  
GLASS

\*Colors may vary when viewed or printed on different devices. For most accurate color representation, please refer to our website or request a product sample.



## GLASS TOLERANCE

| SI Designation | Traditional Designation | Glass Makeup Thickness Range |          |          |          | Glass Weight |         |
|----------------|-------------------------|------------------------------|----------|----------|----------|--------------|---------|
|                |                         | min (mm)                     | max (mm) | min (in) | max (in) | kg/sqm       | lb/sqft |
| 6mm            | 1/4in                   | 5.56                         | 6.20     | 0.219    | 0.244    | 15.52        | 3.18    |

- Strength – Available annealed, heat-strengthened, or tempered
- Edgework – Standard seamed-edge. Flat polished or flat ground edge available
- Fabrication – Available for specific installation and hardware requirements

## PRODUCT FEATURES

- Suitable for interior and exterior applications
- Standard and custom options available
- Can be used to achieve a variety of design goals
- Cost effective and easy to maintain
- Highly durable and abrasion resistant

## APPLICABLE STANDARDS

- ANSI 97.1: Pass
  - » Safety Glazing Materials Used in Buildings
  - » Safety Performance Specifications and Methods Test
- 16 CFR 1201: Pass
- CAN/CGSB 12.1-2017: Pass

## APPLICABLE SPECIFICATIONS

Goldray's Dichroic Glass complies with all major building codes and meets the following industry standards:

- ASTM C1036 - Specification for Flat Glass
- ASTM C1048 - Specification for Heat Strengthened and Fully Tempered Flat Glass
- ASTM C1172 - Specification for Laminated Architectural Flat Glass (When Laminated)

## COMPATIBLE SYSTEMS

☒ MOSAIC ☒ NOVA



**GOLDRAY**  
GLASS

# Circular Domes

## Brings Skylights Full Circle

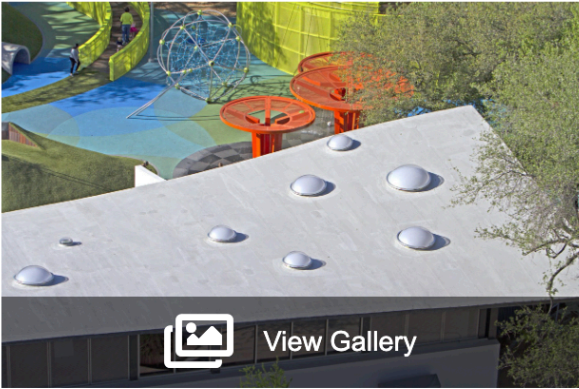
These circular, curb-mounted domes have been updated to meet today's expectations and specifications. With structural improvements like incorporating a vinyl curb and rolled aluminum retainers, Circular Units have reduced condensation and increased thermal performance compared to their earlier counterparts.

### Most common applications:

- Public education, healthcare, and office buildings
- Hotel and conference centers
- Retail and shopping malls

### Key benefits:

- ✓ Standard sizes for double or triple dome
- ✓ Vinyl curb and rolled aluminum retainer
- ✓ No weep holes
- ✓ Available in multiple glazing and finish options



[Find Commercial Rep >](#)

## Tools and Guides



## Product Details

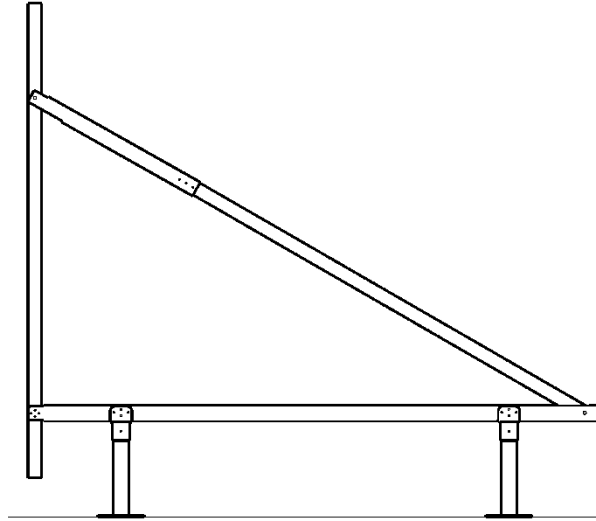
| Sizes                                  | Glazing Options | Finish Options            |
|----------------------------------------|-----------------|---------------------------|
| Double or Triple Dome Curb Mount Units |                 | Outside Dimension of Curb |
| CC2/CC3-36                             |                 | 34"                       |
| CC2/CC3-48                             |                 | 46"                       |
| CC2/CC3-60                             |                 | 57"                       |
| CC2/CC3-72                             |                 | 70"                       |
| CC2/CC3-84                             |                 | 82"                       |
| CC2/CC3-96                             |                 | 94"                       |



RoofScreen LT Frame  
Updated 05.09.23

[www.roofscreen.com](http://www.roofscreen.com)

## RoofScreen LT™ Frame



*Example of RoofScreen LT™ Frame Configuration*

### **Description:**

The RoofScreen LT™ frame is a light-duty frame system that consists of 3 square galvanized tube members and our Square Post Support system, which allows adjustment for roof slope and a watertight connection. This system is adjustable during installation and does not require perfect alignment of the front Post Supports from frame to frame.

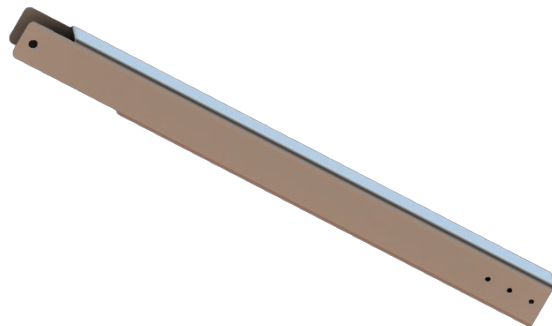
### **Application:**

RoofScreen LT™ frames are designed to be used as the primary structural supports for equipment screens on flat and low sloped commercial rooftops. The frames can accommodate virtually any type of face panel to achieve the desired aesthetics for the building. The Square Post Support system can attach in a watertight manner to any type of roof construction, occasionally needing additional structural blocking or reinforcement.

### **Materials/Components:**

Frame Tubes:

- 2"x 2" and 1.75" x 1.75" 14ga. Galvanized steel (ASTM A653).
- Fy = 50ksi (min).
- G90 galvanized.



RoofScreen LT Frame

Updated 05.09.23

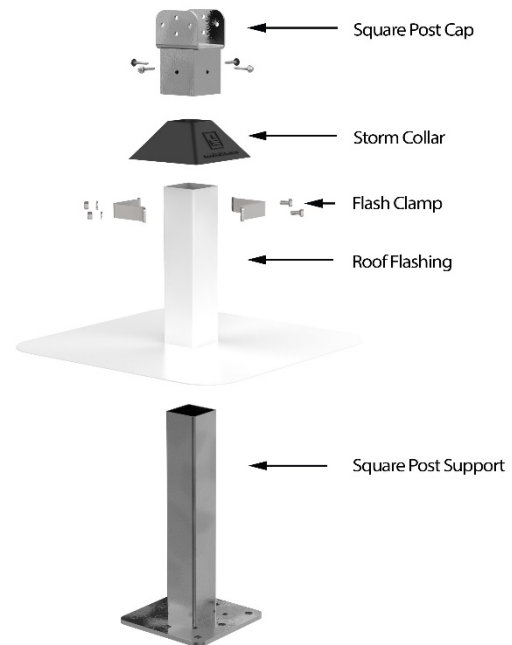
[www.roofscreen.com](http://www.roofscreen.com)

#### Hardware:

- Nuts and bolts used for connectors are corrosion resistant 18-8 stainless steel.
- Tek Screws are carbon steel with premium coating.

#### Roof Connections:

- Galvanized steel Square Post Support.
- Galvanized steel Square Post Cap.
- Flashing boot matching roof type.
- Flash Clamp and EPDM storm collar for added protection.



#### Structural Notes:

The modular design allows the frame configuration and spacing to be adapted to a range of wind loads. Frames can be installed closer together to accommodate varying conditions. Square Post Supports have a fixed connection at the base to the roof structure.

All projects require analysis and calculations by a licensed professional engineer to ensure the design is appropriate for the specific conditions that apply.

#### Installation:

For typical RoofScreen projects, the frame tubes are delivered pre-cut based on the dimensions of the tallest frame on the project. Depending on the amount of roof slope, some tubes may require field trimming during installation. The installation consists of connecting the tubes together, adjusting for levelness, then locking them together with self-drilling tek screws and through bolts. Slotted and tabbed tube connections allow for frame adjustability and ease of installation. A full installation manual is available, and most projects include full shop drawings showing project specific details.

#### Warranty:

When the system is designed and engineered by RoofScreen Mfg., we include a 20-year limited warranty.



# Apex™

The Apex™ rectangular post railing system is constructed with mechanical threaded connections to ensure an exact, precise and secure fitting.

## Apex railing Materials

High quality Aluminum for interior or exterior use. Finishes are powder coated standard colors with custom options available to RAL standards. Post and Top Rail dimensions are 1/2" (12mm) x 2" (51mm). Mounting plates, attachments, and toe boards in powder coated aluminum to match guardrail.

### Infill materials are:

- Aluminum powder coated pickets

Standard attachment methods are surface and side mounts.

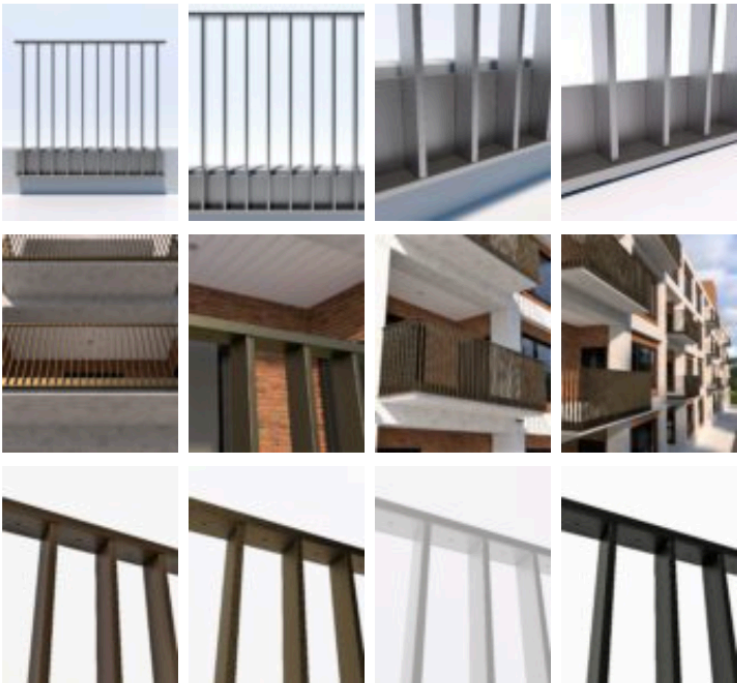
Installation is available as required.

|                   |                   |
|-------------------|-------------------|
| Catalog*          | <a href="#">↓</a> |
| CSI Specs         | <a href="#">↓</a> |
| AutoCAD Drawings* | <a href="#">↓</a> |
| Revit Files*      | <a href="#">↓</a> |

*\*Log-in required for download - call 717.285.4088*



Apex™ guardrail Stainless Steel finish. Other colors available on request.



**HDI Railing Systems**

3905 Continental Drive  
Columbia, PA 17512

**Phone:** 717.285.4088

**Fax:** 717.285.5083

**HDI International Customers:**

Sales Manager:  
Shawn Maguire

**Phone:** (011) 717.381.0830

**email:**

[smaguire@hdirailings.com](mailto:smaguire@hdirailings.com)

Contact a Regional Sales  
Manager by state. 



# Design + Performance

## Versatility with Unmatched Fabrication Flexibility



Geisinger Professional Building  
Jenkins Township, Pennsylvania  
ARCHITECT  
Mericle Commercial Real Estate Services  
Wilkes-Barre, Pennsylvania  
GLAZING CONTRACTOR  
Sterling Glass, Inc., Scranton, Pennsylvania  
PHOTOGRAPHER  
© Perzel Photography Group

Trifab® VersaGlaze® is built on the proven and successful Trifab® platform – with all the versatility its name implies. There are enough framing system choices, fabrication methods, design options and performance levels to please the most discerning building owner, architect and installer. The 4.5" depth Trifab® VersaGlaze® Framing System family is available with non-thermal, thermal and ultra-thermal performance levels. The ultra-thermal Trifab® 451UT Framing System, is designed for the most demanding thermal performance and employs a dual Isolock® thermal break.

### AESTHETICS

Trifab® VersaGlaze® Framing Systems offer designers a choice of front-, center-, back- or multi-plane glass applications. Structural silicone

glazing (SSG) and weatherseal glazing options further expand designers' choices, allowing for a greater range of possibilities for specific project requirements and architectural styles. All systems have a 4-1/2" frame depth; Trifab® VersaGlaze® 450 has 1-3/4" sightlines, while Trifab® VersaGlaze® 451/451T and Trifab® 451UT have 2" sightlines.

With seamless incorporation of Kawneer entrances or windows, including GLASSvent® visually frameless ventilators, Trifab® framing can be used on almost any project. These framing systems can also be packaged with Kawneer curtain walls and overhead glazing, thereby providing a full range of proven, and tested, quality products for the owner, architect and installer from a single-source supplier.

## ECONOMY

Trifab® VersaGlaze® 450/451/451T/451UT Framing Systems offer a variety of fabrication choices to suit your project:

- **Screw Spline** – for economical continuous runs utilizing two-piece vertical members that provide the option to pre-assemble units with controlled shop labor costs and smaller field crews for handling and installation. (available for all systems)
- **Shear Block** – for punched openings or continuous runs using tubular moldings with shear block clips that provide tight joints for transporting large pre-assembled multi-lite units. (available for 450/451/451T systems)
- **Stick** – for fast, easy field fabrication. Field measurements and material cuts can be done when metal is on the jobsite. (available for 450/451/451T systems)
- **Pre-glazed** – The combination of screw spline construction with pre-glazing in the shop accelerates installation and reduces field labor time while minimizing disruption to the surrounding area or existing tenants. Making it an exceptional choice for new or retrofit applications, particularly in urban areas or where space is limited. (available for 451/451T/451UT framing)



**Brighton Landing**  
Cambridge, Massachusetts  
ARCHITECT  
**ADD Inc., Cambridge, Massachusetts**  
GLAZING CONTRACTOR  
**Ipswich Bay Glass Company, Inc., Rowley, Massachusetts**  
PHOTOGRAPHER  
© Gordon Schenck, Jr.

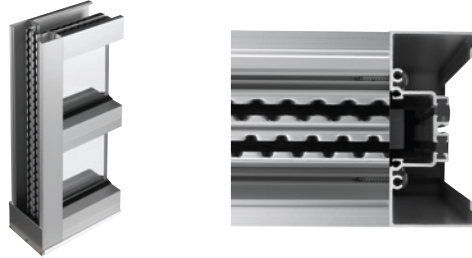
All systems can be flush glazed from either the inside or outside. The weatherseal option provides an alternative to SSG vertical mullions for Trifab® VersaGlaze® 450/451/451T. This ABS/ASA rigid polymer extrusion allows complete inside glazing and creates a flush glass appearance on the building exterior without the added labor of scaffolding or swing stages. Additionally, high-performance flashing options are engineered to eliminate perimeter sill fasteners and associated blind seals.

## FOR THE FINISHING TOUCH

Architectural Class I anodized aluminum and painted finishes in fluoropolymer (AAMA 2605) and solvent-free powder coatings (AAMA 2604) offer a variety of color choices.

## PERFORMANCE

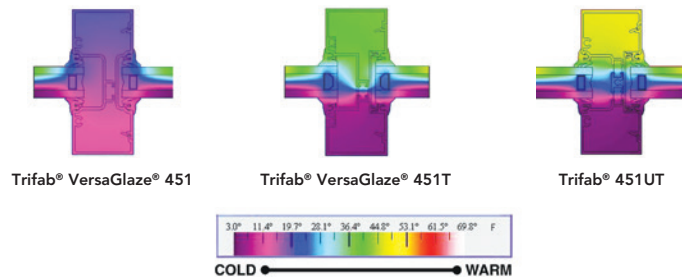
Kawneer's Isolock® thermal break technology creates a composite section, prevents dry shrinkage and is available on Trifab® VersaGlaze® 451T. For even greater thermal performance, a dual Isolock® thermal break is used on Trifab® 451UT.



Trifab® 451UT uses a dual Isolock® thermal break (right) and features a new high-performance sill design, which incorporates a screw-applied end dam (left), ensuring positive engagement and tight joints between the sill flashing and end dam.

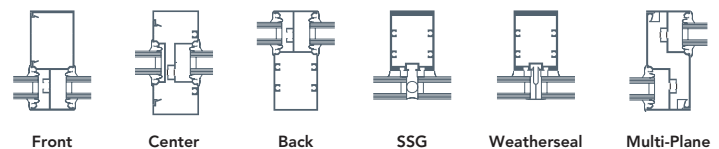
U-factor, CRF values and STC ratings for Trifab® framing systems vary depending upon the glass plane application. Project-specific U-factors can be determined for each individual project. (See the Kawneer Architectural Manual or Kawneer.com for additional information.)

Thermal simulations showing temperature variations from exterior/cold side to interior/warm side.



## PERFORMANCE TEST STANDARDS

|                  |                       |
|------------------|-----------------------|
| Air Infiltration | ASTM E283             |
| Water            | AAMA 501, ASTM E331   |
| Structural       | ASTM E330             |
| Thermal          | AAMA 1503             |
| Thermal Break    | AAMA 505, AAMA TIR-A8 |
| Acoustical       | AAMA 1801, ASTM E1425 |





# Redefining Thermal Entrances with IsoPour™ Technology



Ask more from your door, and get it all with Kawneer's new Insulpour® Thermal Entrances, featuring IsoPour™ technology. This innovative product offering gives architects, developers, owners, and glazing contractors the ability to create a true thermally broken entrance system. It's an ideal solution for high-end commercial and multifamily facilities looking to improve thermal control in common areas with moderate to high traffic.

By merging industry-proven pour and debridge and polymer isolator technologies, Kawneer's IsoPour™ Thermal Break technology creates thermally broken assemblies for enhanced building energy efficiencies with higher structural performance. Insulpour® Thermal Entrances simultaneously provide additional design flexibility through multiple door cross-rail and bottom rail choices along with dual finish capabilities for the door and door frame.

## PERFORMANCE, STRENGTH & SECURITY

The door and frame both leverage IsoPour™ Thermal Break technology, enabling high thermal performance. Specifically aimed at quelling concerns about cold spots and thermal bridging from architects and specifiers, Insulpour® Thermal Entrances feature a true thermally broken door header, which significantly mitigates the formation of condensation when used with a concealed overhead closer. Insulating glass unit options of double pane 1" (25.4 mm) or triple pane 1-1/2" (38.1 mm) improve thermal and sound reduction performance.

For added strength, the 2-1/4" (57.2 mm) deep door has a stout 1/8" (3.2 mm) wall thickness, and the dual-welded corner construction of Insulpour® Thermal Entrances adds long-term performance. Each door corner comes with a limited lifetime warranty, good for the life of the door under normal use operation. It is transferable from building owner to owner and is provided in addition to the standard two-year warranty covering material and workmanship of each Kawneer door.

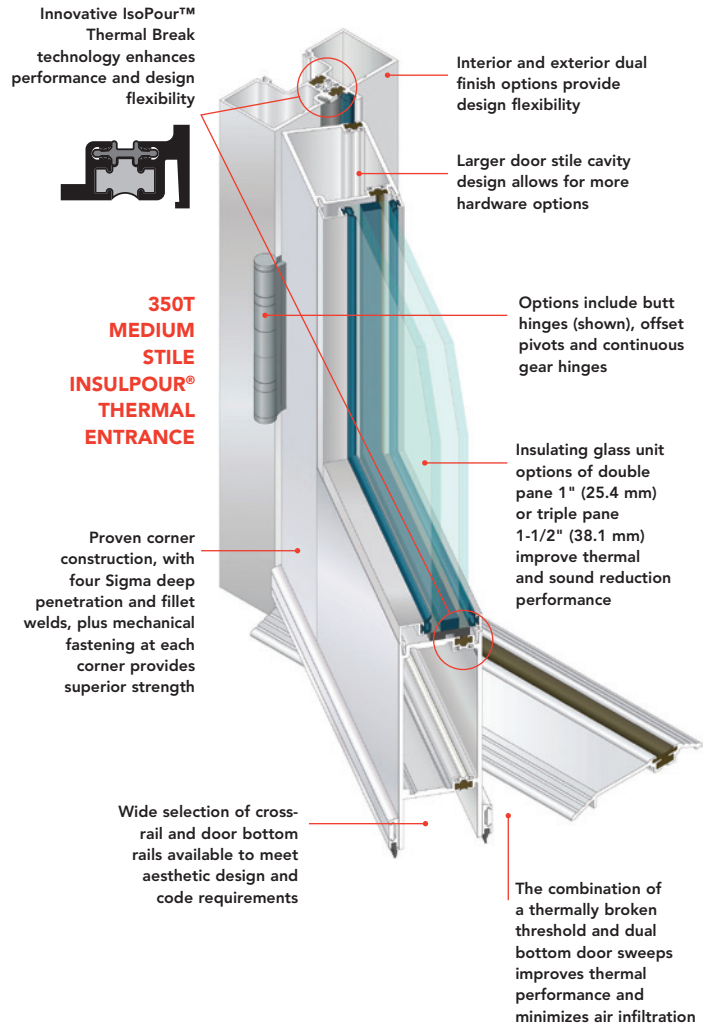
Insulpour® Thermal Entrances meet ASTM E1996 hurricane impact resistant requirements up to Zone 4 and Level D, and have undergone shock tube testing for blast mitigation. Contact your local Kawneer sales representative for limitations and specific application requirements.

## AESTHETICS & DESIGN FLEXIBILITY

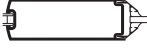
With sightlines that match standard, non-thermally broken entrances, Insulpour® Thermal Entrances offer 250T narrow, 350T medium and 500T wide stile options.

|                   | VERTICAL STILE      | TOP                   | BOTTOM RAIL          |
|-------------------|---------------------|-----------------------|----------------------|
| 250T Narrow Stile | 2-1/2"<br>(63.5 mm) | 2-15/16"<br>(74.6 mm) | 3-7/8"<br>(98.4 mm)  |
| 350T Medium Stile | 3-1/2"<br>(88.9 mm) | 3-1/2"<br>(88.9 mm)   | 6-1/2"<br>(165.1 mm) |
| 500T Wide Stile   | 5"<br>(127 mm)      | 5"<br>(127 mm)        | 6-1/2"<br>(165.1 mm) |

The unique thermal break design allows for a wider choice of locking option hardware than previous thermal entrance designs. Coupled with various cross-rail sizes and multiple bottom rail heights of 7-1/2" (190.5 mm), 10" (254 mm) and 12" (304.8 mm), Insulpour® Thermal Entrances give architects, designers and building owners more opportunities to bring their vision to life.

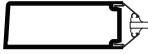




| Product                        | 190<br>Standard Entrances<br>Narrow Stile                                                                                                                                           | 350<br>Standard Entrances<br>Medium Stile                                                                                                                                        | 500<br>Standard Entrances<br>Wide Stile                                                                                                                                                              |  |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Catalog Section                | Entrances                                                                                                                                                                           | Entrances                                                                                                                                                                        | Entrances                                                                                                                                                                                            |  |
| Typical Detail                 |                                                                                                    |                                                                                                 |                                                                                                                   |  |
| Sightline                      | 2-1/8"                                                                                                                                                                              | 3-1/2"                                                                                                                                                                           | 5"                                                                                                                                                                                                   |  |
| Depth                          | 1-3/4"                                                                                                                                                                              | 1-3/4"                                                                                                                                                                           | 1-3/4"                                                                                                                                                                                               |  |
| Applications                   | Moderate Traffic                                                                                                                                                                    | Moderate to High Traffic                                                                                                                                                         | High Traffic                                                                                                                                                                                         |  |
| Infill Options                 | Up to 1"                                                                                                                                                                            | Up to 1"                                                                                                                                                                         | Up to 1"                                                                                                                                                                                             |  |
| Cross Rails/Muntins            | Yes                                                                                                                                                                                 | Yes                                                                                                                                                                              | Yes                                                                                                                                                                                                  |  |
| Thermal                        | No                                                                                                                                                                                  | No                                                                                                                                                                               | No                                                                                                                                                                                                   |  |
| 2 Color Option                 | No                                                                                                                                                                                  | No                                                                                                                                                                               | No                                                                                                                                                                                                   |  |
| Product Description            | 190 narrow stile entrance door offers a slim appearance, features dual-moment corner construction and is designed for applications such as offices, stores and apartment buildings. | 350 medium stile entrance door offers a rugged appearance features dual-moment corner construction and is designed for schools, institutions, and other high traffic conditions. | 500 wide stile entrance door features dual-moment corner construction, and it creates a monumental visual appearance for banks, libraries or buildings experiencing the heaviest traffic conditions. |  |
| Testing for Protective Glazing | —                                                                                                                                                                                   | —                                                                                                                                                                                | —                                                                                                                                                                                                    |  |
| Performance Class/Rating       | —                                                                                                                                                                                   | —                                                                                                                                                                                | —                                                                                                                                                                                                    |  |
| Performance Test Standards     | ASTM E283<br>Dual Moment Corner                                                                                                                                                     | ASTM E283<br>Dual Moment Corner                                                                                                                                                  | ASTM E283<br>Dual Moment Corner                                                                                                                                                                      |  |

Laws and building and safety codes governing the design and use of Kawneer products, such as glazed entrance, window, and curtain wall products, vary widely. Kawneer does not control the selection of product configurations, operating hardware, or glazing materials, and assumes no responsibility therefor.

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| Product                        | 350 Heavy Wall® Entrances                                                                                                         | 500 Heavy Wall® Entrances                                                                      | 350 Tuffline® Entrances                                                                                                                                                                     | 500 Tuffline® Entrances                                                                                |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Catalog Section                | Entrances                                                                                                                         | Entrances                                                                                      | Entrances                                                                                                                                                                                   | Entrances                                                                                              |
| Typical Detail                 |                                                  |               |                                                                                                           |                     |
| Sightline                      | 3-1/2"                                                                                                                            | 5"                                                                                             | 3-1/2"                                                                                                                                                                                      | 5"                                                                                                     |
| Depth                          | 2"                                                                                                                                | 2"                                                                                             | 2"                                                                                                                                                                                          | 2"                                                                                                     |
| Applications                   | High Traffic                                                                                                                      | High Traffic                                                                                   | High Traffic<br>High Abuse                                                                                                                                                                  | High Traffic<br>High Abuse                                                                             |
| Infill Options                 | Up to 1"                                                                                                                          | Up to 1"                                                                                       | Up to 1"                                                                                                                                                                                    | Up to 1"                                                                                               |
| Cross Rails/Muntins            | Yes                                                                                                                               | Yes                                                                                            | Yes                                                                                                                                                                                         | Yes                                                                                                    |
| Thermal                        | No                                                                                                                                | No                                                                                             | No                                                                                                                                                                                          | No                                                                                                     |
| 2 Color Option                 | No                                                                                                                                | No                                                                                             | No                                                                                                                                                                                          | No                                                                                                     |
| Product Description            | A medium stile heavy duty door and door frame with increased wall thickness to provide greater durability in heavy traffic areas. | 500 Heavy Wall® offers the same performance features as the 350 except in a wide stile design. | A medium stile heavy duty door and door frame with hardware package for high abuse applications. Ideal for schools, universities, sports stadiums and other high traffic, high abuse areas. | 500 Tuffline® offers the same performance features as the 350 Tuffline® except in a wide stile design. |
| Testing for Protective Glazing | —                                                                                                                                 | —                                                                                              | —                                                                                                                                                                                           | —                                                                                                      |
| Performance Class/Rating       | —                                                                                                                                 | —                                                                                              | —                                                                                                                                                                                           | —                                                                                                      |
| Performance Test Standards     | ASTM E283<br>Dual Moment Corner                                                                                                   | ASTM E283<br>Dual Moment Corner                                                                | ASTM E283<br>Dual Moment Corner                                                                                                                                                             | Dual Moment Corner                                                                                     |

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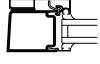
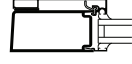
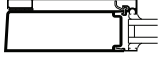
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| Product                        | 250T Insulpour® Thermal Entrances                                                                                                                                                                                                                          | 350T Insulpour® Thermal Entrances                                                                                                                                                   | 500T Insulpour® Thermal Entrances                                                                                                                                                   | AA®250 Thermal Entrances                                                                                                                                                                                                             |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Catalog Section                | Entrances                                                                                                                                                                                                                                                  | Entrances                                                                                                                                                                           | Entrances                                                                                                                                                                           | Entrances                                                                                                                                                                                                                            |
| Typical Detail                 |                                                                                                                                                                           |                                                                                                    |                                                                                                  |                                                                                                                                                   |
| Sightline                      | 2-1/2"                                                                                                                                                                                                                                                     | 3-1/2"                                                                                                                                                                              | 5"                                                                                                                                                                                  | 2-1/2"                                                                                                                                                                                                                               |
| Depth                          | 2-1/4"                                                                                                                                                                                                                                                     | 2-1/4"                                                                                                                                                                              | 2-1/4"                                                                                                                                                                              | 2-1/4"                                                                                                                                                                                                                               |
| Applications                   | Moderate Traffic                                                                                                                                                                                                                                           | Moderate to High Traffic                                                                                                                                                            | High Traffic                                                                                                                                                                        | Moderate Traffic                                                                                                                                                                                                                     |
| Infill Options                 | 1"                                                                                                                                                                                                                                                         | 1"                                                                                                                                                                                  | 1"                                                                                                                                                                                  | 1"                                                                                                                                                                                                                                   |
| Cross Rails/Muntins            | Cross Rails                                                                                                                                                                                                                                                | Cross Rails                                                                                                                                                                         | Cross Rails                                                                                                                                                                         | Yes                                                                                                                                                                                                                                  |
| Thermal                        | Yes                                                                                                                                                                                                                                                        | Yes                                                                                                                                                                                 | Yes                                                                                                                                                                                 | Yes                                                                                                                                                                                                                                  |
| 2 Color Option                 | Yes                                                                                                                                                                                                                                                        | Yes                                                                                                                                                                                 | Yes                                                                                                                                                                                 | Yes                                                                                                                                                                                                                                  |
| Product Description            | 250T is a thermally broken entrance system, both door and door frame are thermally broken. The door features the dual-moment corner construction and is engineered for use with Kawneer's Trifab® VersaGlaze® 451T, 451UT, 601T, and 601UT framing system. | 350T offers the same performance features as the 250T except in a medium stile design.                                                                                              | 500T offers the same performance features as the 250T except in a wide stile design.                                                                                                | AA®250 is a thermally broken entrance system, both door and door frame are thermally broken. The door features the dual-moment corner construction and is engineered for use with Kawneer's Trifab® VersaGlaze® 451T framing system. |
| Testing for Protective Glazing | —                                                                                                                                                                                                                                                          | Small Missile<br>Large Missile<br>Blast Mitigation                                                                                                                                  | Small Missile<br>Large Missile<br>Blast Mitigation                                                                                                                                  | Large Missile                                                                                                                                                                                                                        |
| Performance Class/Rating       | —                                                                                                                                                                                                                                                          | +/- 70 PSF Max.                                                                                                                                                                     | +/- 70 PSF Max.                                                                                                                                                                     | +/- 45 PSF                                                                                                                                                                                                                           |
| Performance Test Standards     | AAMA 507<br>AAMA 925<br>AAMA 1503<br>ASTM E90<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>NFRC 100/200/500                                                                                                                                                   | AAMA 507<br>AAMA 925<br>AAMA 1503<br>ASTM E90<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>ASTM E1886<br>ASTM E1996<br>ASTM F2927<br>GSA T501-2003<br>NFRC 100/200/500<br>UFC 4-010-01 | AAMA 507<br>AAMA 925<br>AAMA 1503<br>ASTM E90<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>ASTM E1886<br>ASTM E1996<br>ASTM F2927<br>GSA T501-2003<br>NFRC 100/200/500<br>UFC 4-010-01 | AAMA 925<br>AAMA 1304<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>ASTM E1886<br>ASTM E1996                                                                                                                                             |

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| Product                        | AA®425 Thermal Entrances                                                                 | 260 Insulclad® Thermal Entrances                                                                                                                                                                                               | 360 Insulclad® Thermal Entrances                                                                           | 560 Insulclad® Thermal Entrances                                                                         |
|--------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Catalog Section                | Entrances                                                                                | Entrances                                                                                                                                                                                                                      | Entrances                                                                                                  | Entrances                                                                                                |
| Typical Detail                 |         |                                                                                                                                               |                          |                       |
| Sightline                      | 4-1/4"                                                                                   | 2-11/16"                                                                                                                                                                                                                       | 4-1/16"                                                                                                    | 5-9/16"                                                                                                  |
| Depth                          | 2-1/4"                                                                                   | 2-1/4"                                                                                                                                                                                                                         | 2-1/4"                                                                                                     | 2-1/4"                                                                                                   |
| Applications                   | Moderate Traffic                                                                         | Moderate Traffic Thermal                                                                                                                                                                                                       | Moderate Traffic                                                                                           | Moderate Traffic                                                                                         |
| Infill Options                 | 1"                                                                                       | 1"                                                                                                                                                                                                                             | 1"                                                                                                         | 1"                                                                                                       |
| Cross Rails/Muntins            | Yes                                                                                      | Yes                                                                                                                                                                                                                            | Yes                                                                                                        | Yes                                                                                                      |
| Thermal                        | Yes                                                                                      | Extruded PVC / VHB Acrylic Foam Tape                                                                                                                                                                                           | Extruded PVC / VHB Acrylic Foam Tape                                                                       | Extruded PVC / VHB Acrylic Foam Tape                                                                     |
| 2 Color Option                 | Yes                                                                                      | Yes                                                                                                                                                                                                                            | Yes                                                                                                        | Yes                                                                                                      |
| Product Description            | AA®425 offers the same performance features as the AA®250 except in a wide stile design. | 260 Insulclad® is a complete package of thermally broken door and door frame. Features dual-moment corner construction and is engineered for use with Kawneer's Trifab® VersaGlaze® 451T Framing System and 1600 Wall Systems. | 360 Insulclad® offers the same performance features as the 260 Insulclad® except in a medium stile design. | 560 Insulclad® offers the same performance features as the 260 Insulclad® except in a wide stile design. |
| Testing for Protective Glazing | Large Missile Blast Mitigation                                                           | —                                                                                                                                                                                                                              | —                                                                                                          | —                                                                                                        |
| Performance Class/Rating       | +/- 50 PSF                                                                               | —                                                                                                                                                                                                                              | —                                                                                                          | —                                                                                                        |
| Performance Test Standards     | AAMA 925<br>AAMA 1304<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>ASTM E1886<br>ASTM E1996 | AAMA 507<br>ASTM E283<br>Dual Moment Corner<br>NFRC 100/200/500                                                                                                                                                                | AAMA 507<br>ASTM E283<br>Dual Moment Corner<br>NFRC 100/200/500                                            | AAMA 507<br>ASTM E283<br>Dual Moment Corner<br>NFRC 100/200/500                                          |

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| Product                        | Flushline® Entrances                                                                                                                                                    |  |  |  |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| Catalog Section                | Entrances                                                                                                                                                               |  |  |  |
| Typical Detail                 |                                                                                        |  |  |  |
| Sightline                      | N/A                                                                                                                                                                     |  |  |  |
| Depth                          | 1-3/4"                                                                                                                                                                  |  |  |  |
| Applications                   | Moderate to High Traffic,<br>Impact Areas                                                                                                                               |  |  |  |
| Infill Options                 | 1/4" or 1"                                                                                                                                                              |  |  |  |
| Cross Rails/Muntins            | No                                                                                                                                                                      |  |  |  |
| Thermal                        | No                                                                                                                                                                      |  |  |  |
| 2 Color Option                 | Yes                                                                                                                                                                     |  |  |  |
| Product Description            | A urethane foam-filled door with aluminum or FRP face sheet designs in various interior and exterior applications such as schools and manufacturing facilities.         |  |  |  |
| Testing for Protective Glazing | Small Missile<br>Large Missile<br>Blast Mitigation                                                                                                                      |  |  |  |
| Performance Class/Rating       | +/- 75 PSF Max.                                                                                                                                                         |  |  |  |
| Performance Test Standards     | AAMA 507<br>AAMA 1503<br>ASTM E90<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>ASTM E1886<br>ASTM E1996<br>ASTM F2927<br>GSA T501-2003<br>NFRC 100/200/500<br>UFC 4-010-01 |  |  |  |

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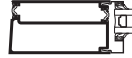
| Product                        | 350 IR Entrances                                                                                                                                                                                                             | 500 IR Entrances                                                                                                                                                                                                           | 350 Heavy Wall® IR Entrances                                                                                                     | 500 Heavy Wall® IR Entrances                                                               |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Catalog Section                | Entrances                                                                                                                                                                                                                    | Entrances                                                                                                                                                                                                                  | Entrances                                                                                                                        | Entrances                                                                                  |
| Typical Detail                 |                                                                                                                                             |                                                                                                                                           |                                                |         |
| Sightline                      | 3-1/2"                                                                                                                                                                                                                       | 5"                                                                                                                                                                                                                         | 3-1/2"                                                                                                                           | 5"                                                                                         |
| Depth                          | 1-3/4"                                                                                                                                                                                                                       | 1-3/4"                                                                                                                                                                                                                     | 2"                                                                                                                               | 2"                                                                                         |
| Applications                   | Moderate to High Traffic                                                                                                                                                                                                     | Moderate to High Traffic                                                                                                                                                                                                   | Moderate to High Traffic                                                                                                         | Moderate to High Traffic                                                                   |
| Infill Options                 | 9/16"                                                                                                                                                                                                                        | 9/16"                                                                                                                                                                                                                      | 9/16", 1"                                                                                                                        | 9/16", 1"                                                                                  |
| Cross Rails/Muntins            | Cross Rails                                                                                                                                                                                                                  | Cross Rails                                                                                                                                                                                                                | Cross Rails                                                                                                                      | Cross Rails                                                                                |
| Thermal                        | No                                                                                                                                                                                                                           | No                                                                                                                                                                                                                         | No                                                                                                                               | No                                                                                         |
| 2 Color Option                 | No                                                                                                                                                                                                                           | No                                                                                                                                                                                                                         | No                                                                                                                               | No                                                                                         |
| Product Description            | 350 IR medium stile entrance offers a rugged appearance, features dual-moment corner construction, silicone sealed interior glass stop, and hardware designed to meet the code requirements of wind-borne debris protection. | 500 IR wide stile entrance offers a rugged appearance, features dual-moment corner construction, silicone sealed interior glass stop, and hardware designed to meet the code requirements of wind-borne debris protection. | 350 Heavy Wall® IR offers the same features as the 350IR, increased wall thickness provides for greater durability and strength. | 500 Heavy Wall® IR offers the same performance features as the 350 except in a wide stile. |
| Testing for Protective Glazing | Small Missile<br>Large Missile                                                                                                                                                                                               | Small Missile<br>Large Missile                                                                                                                                                                                             | Small Missile<br>Large Missile                                                                                                   | Small Missile<br>Large Missile                                                             |
| Performance Class/Rating       | +/- 65 PSF<br>+/- 85 PSF                                                                                                                                                                                                     | +/- 65 PSF<br>+/- 85 PSF                                                                                                                                                                                                   | +/- 110 PSF                                                                                                                      | +/- 110 PSF                                                                                |
| Performance Test Standards     | ASTM E330<br>ASTM E1886<br>ASTM E1996<br>Dual - Moment Corner<br>TAS 201, 202, 203                                                                                                                                           | ASTM E330<br>ASTM E1886<br>ASTM E1996<br>Dual - Moment Corner<br>TAS 201, 202, 203                                                                                                                                         | ASTM E330<br>ASTM E1886<br>ASTM E1996<br>Dual - Moment Corner<br>TAS 201, 202, 203                                               | ASTM E330<br>ASTM E1886<br>ASTM E1996<br>Dual - Moment Corner<br>TAS 201, 202, 203         |

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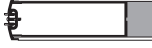


| Product                        | 350T Insulpour® Thermal Entrances                                                                                                                                                   | 500T Insulpour® Thermal Entrances                                                                                                                                                   | AA®425 Thermal Entrances                                                                 |  |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|--|
| Catalog Section                | Entrances                                                                                                                                                                           | Entrances                                                                                                                                                                           | Entrances                                                                                |  |
| Typical Detail                 |                                                                                                    |                                                                                                    |       |  |
| Sightline                      | 3-1/2"                                                                                                                                                                              | 5"                                                                                                                                                                                  | 4-1/4"                                                                                   |  |
| Depth                          | 2-1/4"                                                                                                                                                                              | 2-1/4"                                                                                                                                                                              | 2-1/4"                                                                                   |  |
| Applications                   | Moderate to High Traffic                                                                                                                                                            | High Traffic                                                                                                                                                                        | Moderate Traffic                                                                         |  |
| Infill Options                 | 1"                                                                                                                                                                                  | 1"                                                                                                                                                                                  | 1"                                                                                       |  |
| Cross Rails/Muntins            | Cross Rails                                                                                                                                                                         | Cross Rails                                                                                                                                                                         | No                                                                                       |  |
| Thermal                        | Yes                                                                                                                                                                                 | Yes                                                                                                                                                                                 | Yes                                                                                      |  |
| 2 Color Option                 | Yes                                                                                                                                                                                 | Yes                                                                                                                                                                                 | Yes                                                                                      |  |
| Product Description            | 350T offers the same performance features as the 250T except in a medium stile design.                                                                                              | 500T offers the same performance features as the 250T except in a wide stile design.                                                                                                | AA®425 offers the same performance features as the AA®250 except in a wide stile design. |  |
| Testing for Protective Glazing | Small Missile<br>Large Missile<br>Blast Mitigation                                                                                                                                  | Small Missile<br>Large Missile<br>Blast Mitigation                                                                                                                                  | Large Missile<br>Blast Mitigation                                                        |  |
| Performance Class/Rating       | +/- 70 PSF Max.                                                                                                                                                                     | +/- 70 PSF Max.                                                                                                                                                                     | +/- 50 PSF                                                                               |  |
| Performance Test Standards     | AAMA 507<br>AAMA 925<br>AAMA 1503<br>ASTM E90<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>ASTM E1886<br>ASTM E1996<br>ASTM F2927<br>GSA T501-2003<br>NFRC 100/200/500<br>UFC 4-010-01 | AAMA 507<br>AAMA 925<br>AAMA 1503<br>ASTM E90<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>ASTM E1886<br>ASTM E1996<br>ASTM F2927<br>GSA T501-2003<br>NFRC 100/200/500<br>UFC 4-010-01 | AAMA 925<br>AAMA 1304<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>ASTM E1886<br>ASTM E1996 |  |

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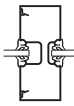
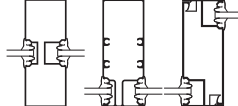
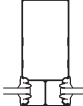
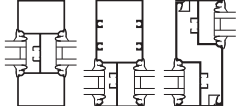
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| Product                        | Flushline® Entrances                                                                                                                                                    |  |  |  |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| Catalog Section                | Entrances                                                                                                                                                               |  |  |  |
| Typical Detail                 |                                                                                        |  |  |  |
| Sightline                      | N/A                                                                                                                                                                     |  |  |  |
| Depth                          | 1-3/4"                                                                                                                                                                  |  |  |  |
| Applications                   | Moderate to High Traffic,<br>Impact Areas                                                                                                                               |  |  |  |
| Infill Options                 | 1/4" or 1"                                                                                                                                                              |  |  |  |
| Cross Rails/Muntins            | No                                                                                                                                                                      |  |  |  |
| Thermal                        | No                                                                                                                                                                      |  |  |  |
| 2 Color Option                 | Yes                                                                                                                                                                     |  |  |  |
| Product Description            | A urethane foam-filled door with aluminum or FRP face sheet designs in various interior and exterior applications such as schools and manufacturing facilities.         |  |  |  |
| Testing for Protective Glazing | Small Missile<br>Large Missile<br>Blast Mitigation                                                                                                                      |  |  |  |
| Performance Class/Rating       | +/- 75 PSF Max.                                                                                                                                                         |  |  |  |
| Performance Test Standards     | AAMA 507<br>AAMA 1503<br>ASTM E90<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>ASTM E1886<br>ASTM E1996<br>ASTM F2927<br>GSA T501-2003<br>NFRC 100/200/500<br>UFC 4-010-01 |  |  |  |

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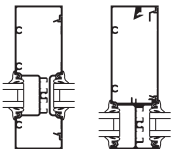
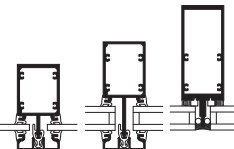


| Product                        | Trifab® 400 Framing<br>(1-3/4" x 4")                                                                                                                | Trifab® VersaGlaze® 450 Framing System<br>1-3/4" sightline<br>(1-3/4" x 4-1/2")                                                                                                                                     | Trifab® VersaGlaze® 450 Framing System<br>2" sightline<br>(2" x 4-1/2")<br>(2" x 2-1/4" Veneer)                                                                                     | Trifab® VersaGlaze® 451 Framing System<br>(2" x 4-1/2")                                                                                                                                                        |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Catalog Section                | Framing                                                                                                                                             | Framing                                                                                                                                                                                                             | Framing                                                                                                                                                                             | Framing                                                                                                                                                                                                        |
| Typical Detail                 |                                                                    |                                                                                                                                    |                                                                                                  |                                                                                                                             |
| Applications                   | Storefront<br>Ribbon Windows<br>Punched Openings                                                                                                    | Storefront<br>Ribbon Windows<br>Punched Openings                                                                                                                                                                    | Storefront<br>Ribbon Windows<br>Punched Openings                                                                                                                                    | Storefront<br>Ribbon Windows<br>Punched Openings                                                                                                                                                               |
| Glass Plane Options            | Center                                                                                                                                              | Center<br>Front<br>Back<br>Multi-Plane                                                                                                                                                                              | Front                                                                                                                                                                               | Center<br>Front<br>Back<br>Multi-Plane                                                                                                                                                                         |
| Infill Options                 | 1/8", 1/4" & 3/8"                                                                                                                                   | 1/8", 1/4" & 3/8"                                                                                                                                                                                                   | 1/8", 1/4" & 3/8"                                                                                                                                                                   | Up to 1-1/8"                                                                                                                                                                                                   |
| Glazing Options                | Inside Glazed<br>Outside Glazed                                                                                                                     | Inside Glazed<br>Outside Glazed                                                                                                                                                                                     | Inside Glazed<br>Outside Glazed                                                                                                                                                     | Inside Glazed<br>Outside Glazed                                                                                                                                                                                |
| Thermal                        | No                                                                                                                                                  | No                                                                                                                                                                                                                  | No                                                                                                                                                                                  | No                                                                                                                                                                                                             |
| SSG                            | No                                                                                                                                                  | Optional                                                                                                                                                                                                            | Optional                                                                                                                                                                            | Optional                                                                                                                                                                                                       |
| Weatherseal                    | No                                                                                                                                                  | Optional                                                                                                                                                                                                            | Optional                                                                                                                                                                            | Optional                                                                                                                                                                                                       |
| 2 Color Option                 | No                                                                                                                                                  | No                                                                                                                                                                                                                  | No                                                                                                                                                                                  | Yes<br>with Front Stick                                                                                                                                                                                        |
| Integrated Entrance Framing    | Yes                                                                                                                                                 | Yes                                                                                                                                                                                                                 | Yes                                                                                                                                                                                 | Yes                                                                                                                                                                                                            |
| Windows Integration            | Yes                                                                                                                                                 | Yes                                                                                                                                                                                                                 | Yes                                                                                                                                                                                 | Yes                                                                                                                                                                                                            |
| GLASSvent® Integration         | Yes                                                                                                                                                 | Yes                                                                                                                                                                                                                 | Yes                                                                                                                                                                                 | Yes                                                                                                                                                                                                            |
| Fabrication Method             | Screw Spline, Shear Block, Stick                                                                                                                    | Screw Spline, Shear Block, Stick, Continuous Head and Sill                                                                                                                                                          | Stick                                                                                                                                                                               | Screw Spline, Shear Block, Stick, Continuous Head and Sill                                                                                                                                                     |
| Product Description            | A 1-3/4" x 4" flush glazed system for 1/4" glass. Designed for quick installation on low rise buildings. It offers design economy with flexibility. | A 1-3/4" x 4-1/2" flush glazed system for 1/4" glass. VersaGlaze® is engineered for design and fabrication versatility with variable glass plane choices, SSG or Weatherseal options and four types of fabrication. | A 2" x 2-1/4" Veneer and a 2" x 4-1/2" Captured, flush glazed system for 1/4" glass with SSG and Weatherseal options. Designed for quick installation on low to mid-rise buildings. | A 2" x 4-1/2" flush glazed system for 1" glass. VersaGlaze® is engineered for design and fabrication versatility with variable glass plane choices, SSG or Weatherseal options, and four types of fabrication. |
| Testing for Protective Glazing | —                                                                                                                                                   | —                                                                                                                                                                                                                   | —                                                                                                                                                                                   | —                                                                                                                                                                                                              |
| Performance Test Standards     | AAMA 501<br>ASTM E283<br>ASTM E330<br>ASTM E331                                                                                                     | AAMA 501<br>ASTM E283<br>ASTM E330<br>ASTM E331                                                                                                                                                                     | AAMA 501<br>ASTM E283<br>ASTM E330<br>ASTM E331                                                                                                                                     | AAMA 501, AAMA 507,<br>AAMA1801,<br>ASTM E283, ASTM E330,<br>ASTM E331, ASTM E1425,<br>NFRC 100/200/500                                                                                                        |

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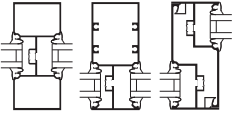
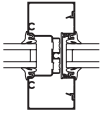
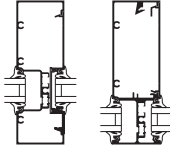
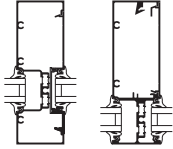
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| Product                         | Trifab® VersaGlaze®<br>601 Framing System<br>(2" x 6")                                                                                                                                             | EnCORE®<br>Framing System<br>(1-3/4" x Variable)                                                                                                                                                                                                 |  |  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Catalog Section                 | Framing                                                                                                                                                                                            | Framing                                                                                                                                                                                                                                          |  |  |
| Typical Detail                  |                                                                                                                   |                                                                                                                                                                 |  |  |
| Applications                    | Storefront<br>Ribbon Windows<br>Punched Openings                                                                                                                                                   | Storefront<br>Ribbon Windows<br>Punched Openings                                                                                                                                                                                                 |  |  |
| Glass Plane Options             | Center<br>Front                                                                                                                                                                                    | Center<br>Front                                                                                                                                                                                                                                  |  |  |
| Infill Options                  | Up to 1-1/8"                                                                                                                                                                                       | Up to 1-1/8"                                                                                                                                                                                                                                     |  |  |
| Glazing Options                 | Inside Glazed<br>Outside Glazed                                                                                                                                                                    | Outside Glazed                                                                                                                                                                                                                                   |  |  |
| Thermal                         | Dual IsoLock®<br>Pour and Debridge                                                                                                                                                                 | Polymer Glazing Clip                                                                                                                                                                                                                             |  |  |
| SSG                             | Yes (Front)                                                                                                                                                                                        | Optional                                                                                                                                                                                                                                         |  |  |
| Weatherseal                     | No                                                                                                                                                                                                 | No                                                                                                                                                                                                                                               |  |  |
| 2 Color Option                  | No                                                                                                                                                                                                 | Yes                                                                                                                                                                                                                                              |  |  |
| Integrated Entrance Framing     | Yes                                                                                                                                                                                                | Yes                                                                                                                                                                                                                                              |  |  |
| Windows Integration             | Yes                                                                                                                                                                                                | Yes                                                                                                                                                                                                                                              |  |  |
| GLASSvent® Integration          | Yes                                                                                                                                                                                                | Yes                                                                                                                                                                                                                                              |  |  |
| Versoleil® Sunshade Integration | Yes (Center Only)                                                                                                                                                                                  | No                                                                                                                                                                                                                                               |  |  |
| Fabrication Method              | Screw Spline, Shear Block,<br>Stick                                                                                                                                                                | Screw Spline<br>Shear Block<br>Continuous Head and Sill                                                                                                                                                                                          |  |  |
| Product Description             | A versatile 2" x 6" flush glazed system for 1" glass available in Center Set and Front Set options. Engineered to perform to current energy code requirements using a dual IsoLock® thermal break. | A versatile two-piece face and gutter system that incorporates an engineered polymer glazing clip for thermal performance. It offers a variety of depth combinations to meet various design possibilities including SSG and curved applications. |  |  |
| Testing for Protective Glazing  | —                                                                                                                                                                                                  | —                                                                                                                                                                                                                                                |  |  |
| Performance Test Standards      | AAMA 501, AAMA 505,<br>AAMA 507, AAMA 1503,<br>AAMA 1801, AAMA TIR-A8,<br>ASTM E283, ASTM E330,<br>ASTM E331, ASTM E1425,<br>CSA-A440,<br>NFRC 100/200/500                                         | AAMA 150<br>AAMA 501<br>AAMA 507<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>NFRC 100/200/500                                                                                                                                                      |  |  |

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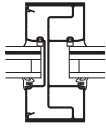


| Product                         | Trifab® VersaGlaze®<br>451T Framing System<br>(2" x 4-1/2")                                                                                                                                                                                   | Trifab® 451UT<br>Framing<br>(2" x 4-1/2")                                                                                                                  | Trifab® VersaGlaze®<br>601T Framing System<br>(2" x 6")                                                                                                    | Trifab® VersaGlaze®<br>601UT Framing System<br>(2" x 6")                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Catalog Section                 | Framing                                                                                                                                                                                                                                       | Framing                                                                                                                                                    | Framing                                                                                                                                                    | Framing                                                                                                                                                    |
| Typical Detail                  |                                                                                                                                                              |                                                                           |                                                                         |                                                                         |
| Applications                    | Storefront<br>Ribbon Windows<br>Punched Openings                                                                                                                                                                                              | Storefront<br>Ribbon Windows<br>Punched Openings                                                                                                           | Storefront<br>Ribbon Windows<br>Punched Openings                                                                                                           | Storefront<br>Ribbon Windows<br>Punched Openings                                                                                                           |
| Glass Plane Options             | Center, Front,<br>Back, Multi-Plane                                                                                                                                                                                                           | Center                                                                                                                                                     | Center<br>Front                                                                                                                                            | Center<br>Front                                                                                                                                            |
| Infill Options                  | Up to 1-1/8"                                                                                                                                                                                                                                  | Up to 1-1/8"                                                                                                                                               | Up to 1-1/8"                                                                                                                                               | Up to 1-1/8"                                                                                                                                               |
| Glazing Options                 | Inside Glazed<br>Outside Glazed                                                                                                                                                                                                               | Inside Glazed<br>Outside Glazed                                                                                                                            | Inside Glazed<br>Outside Glazed                                                                                                                            | Inside Glazed<br>Outside Glazed                                                                                                                            |
| Thermal                         | IsoLock®<br>Pour and Debridge                                                                                                                                                                                                                 | Dual IsoLock®<br>Pour and Debridge                                                                                                                         | Dual IsoLock®<br>Pour and Debridge                                                                                                                         | Dual IsoLock®<br>Pour and Debridge                                                                                                                         |
| SSG                             | Optional                                                                                                                                                                                                                                      | No                                                                                                                                                         | Yes (Front)                                                                                                                                                | Yes (Front)                                                                                                                                                |
| Weatherseal                     | Optional                                                                                                                                                                                                                                      | No                                                                                                                                                         | No                                                                                                                                                         | No                                                                                                                                                         |
| 2 Color Option                  | Yes<br>with Front Stick                                                                                                                                                                                                                       | No                                                                                                                                                         | No                                                                                                                                                         | No                                                                                                                                                         |
| Integrated Entrance Framing     | Yes                                                                                                                                                                                                                                           | Yes                                                                                                                                                        | Yes                                                                                                                                                        | Yes                                                                                                                                                        |
| Windows Integration             | Yes                                                                                                                                                                                                                                           | Yes                                                                                                                                                        | Yes                                                                                                                                                        | Yes                                                                                                                                                        |
| GLASSvent® Integration          | Yes                                                                                                                                                                                                                                           | Yes                                                                                                                                                        | Yes                                                                                                                                                        | Yes                                                                                                                                                        |
| Versoleil® Sunshade Integration | Yes                                                                                                                                                                                                                                           | Yes                                                                                                                                                        | Yes (Center Only)                                                                                                                                          | Yes (Center Only)                                                                                                                                          |
| Fabrication Method              | Screw Spline, Shear Block,<br>Stick, Continuous Head and Sill                                                                                                                                                                                 | Screw Spline                                                                                                                                               | Screw Spline, Shear Block,<br>Stick                                                                                                                        | Screw Spline, Shear Block,<br>Stick                                                                                                                        |
| Product Description             | A 2" x 4-1/2" flush glazed system for 1" glass. VersaGlaze® is engineered for design and fabrication versatility with variable glass planes choices, SSG or Weatherseal options, IsoLock® thermal break option and four types of fabrication. | A 2" x 4-1/2" flush glazed system for 1" glass. Engineered to perform to current energy code requirements using a dual IsoLock® thermal break.             | A 2" x 6" flush glazed system for 1" glass. Engineered to perform to current energy code requirements using a dual IsoLock® thermal break.                 | A 2" x 6" flush glazed system for 1" glass. Engineered to perform to current energy code requirements using a dual IsoLock® thermal break.                 |
| Testing for Protective Glazing  | —                                                                                                                                                                                                                                             | —                                                                                                                                                          | —                                                                                                                                                          | —                                                                                                                                                          |
| Performance Test Standards      | AAMA 501.1, AAMA 507,<br>AAMA 501, AAMA 505,<br>AAMA 1503, AAMA 1801,<br>AAMA TIR-A8,<br>ASTM E283, ASTM E330,<br>ASTM E331, ASTM E1425,<br>NFRC 100/200/500                                                                                  | AAMA 501, AAMA 505,<br>AAMA 1503, AAMA 507,<br>AAMA 1801, AAMA TIR-A8,<br>ASTM E283, ASTM E330,<br>ASTM E331, ASTM E1425,<br>CSA-A440,<br>NFRC 100/200/500 | AAMA 501, AAMA 505,<br>AAMA 507, AAMA 1503,<br>AAMA 1801, AAMA TIR-A8,<br>ASTM E283, ASTM E330,<br>ASTM E331, ASTM E1425,<br>CSA-A440,<br>NFRC 100/200/500 | AAMA 501, AAMA 505,<br>AAMA 507, AAMA 1503,<br>AAMA 1801, AAMA TIR-A8,<br>ASTM E283, ASTM E330,<br>ASTM E331, ASTM E1425,<br>CSA-A440,<br>NFRC 100/200/500 |

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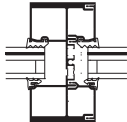
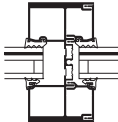
| Product                         | IR 500 Framing<br>2-1/2" x 5"<br>(Wind-borne Debris)                                                                                                                                                                           | IR 501 Framing<br>2-1/2" x 5"<br>(Wind-borne Debris)                                                                                                                                                                           |  |  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Catalog Section                 | Framing                                                                                                                                                                                                                        | Framing                                                                                                                                                                                                                        |  |  |
| Typical Detail                  |                                                                                                                                               |                                                                                                                                               |  |  |
| Applications                    | Storefront<br>Ribbon Windows<br>Punched Openings                                                                                                                                                                               | Storefront<br>Ribbon Windows<br>Punched Openings                                                                                                                                                                               |  |  |
| Glass Plane Options             | Center                                                                                                                                                                                                                         | Center                                                                                                                                                                                                                         |  |  |
| Infill Options                  | 9/16", 5/8" (Impact)<br>1/4" (Non-Impact)                                                                                                                                                                                      | 1-5/16" (Impact)<br>1" (Non-Impact)                                                                                                                                                                                            |  |  |
| Glazing Options                 | Outside Glazed                                                                                                                                                                                                                 | Outside Glazed                                                                                                                                                                                                                 |  |  |
| Thermal                         | No                                                                                                                                                                                                                             | No                                                                                                                                                                                                                             |  |  |
| SSG                             | No                                                                                                                                                                                                                             | No                                                                                                                                                                                                                             |  |  |
| Weatherseal                     | No                                                                                                                                                                                                                             | No                                                                                                                                                                                                                             |  |  |
| 2 Color Option                  | No                                                                                                                                                                                                                             | No                                                                                                                                                                                                                             |  |  |
| Integrated Entrance Framing     | Yes                                                                                                                                                                                                                            | Yes                                                                                                                                                                                                                            |  |  |
| Windows Integration             | No                                                                                                                                                                                                                             | No                                                                                                                                                                                                                             |  |  |
| GLASSvent® Integration          | No                                                                                                                                                                                                                             | No                                                                                                                                                                                                                             |  |  |
| Versoleil® Sunshade Integration | No                                                                                                                                                                                                                             | No                                                                                                                                                                                                                             |  |  |
| Fabrication Method              | Screw Spline                                                                                                                                                                                                                   | Screw Spline                                                                                                                                                                                                                   |  |  |
| Product Description             | A 2-1/2" x 5" framing system for wind-borne debris applications. It offers a center flush glazed look with either a interior structural silicone seal (wet glazed) or EPDM gasket (dry glazed) for large missile applications. | A 2-1/2" x 5" framing system for wind-borne debris applications. It offers a center flush glazed look with either a interior structural silicone seal (wet glazed) or EPDM gasket (dry glazed) for large missile applications. |  |  |
| Testing for Protective Glazing  | Large Missile                                                                                                                                                                                                                  | Small Missile<br>Large Missile                                                                                                                                                                                                 |  |  |
| Performance Test Standards      | AAMA 501<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>ASTM E1886<br>ASTM E1996<br>TAS 201, 202, 203                                                                                                                               | AAMA 501<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>ASTM E1886<br>ASTM E1996<br>TAS 201, 202, 203                                                                                                                               |  |  |

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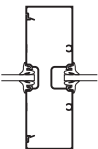
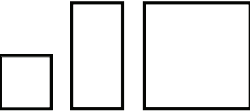


| Product                         | IR 501T Framing<br>2-3/4" x 5"<br>(Wind-borne Debris)                                                                                                                                                                                  | IR 501UT Framing<br>2-3/4" x 5"<br>(Wind-borne Debris)                                                                                                                                                                                 |  |  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Catalog Section                 | Framing                                                                                                                                                                                                                                | Framing                                                                                                                                                                                                                                |  |  |
| Typical Detail                  |                                                                                                                                                       |                                                                                                                                                       |  |  |
| Applications                    | Storefront<br>Ribbon Windows<br>Punched Openings                                                                                                                                                                                       | Storefront<br>Ribbon Windows<br>Punched Openings                                                                                                                                                                                       |  |  |
| Glass Plane Options             | Center                                                                                                                                                                                                                                 | Center                                                                                                                                                                                                                                 |  |  |
| Infill Options                  | 1-5/16" (Impact)                                                                                                                                                                                                                       | 1-5/16" (Impact)                                                                                                                                                                                                                       |  |  |
| Glazing Options                 | Outside Glazed                                                                                                                                                                                                                         | Outside Glazed                                                                                                                                                                                                                         |  |  |
| Thermal                         | Yes                                                                                                                                                                                                                                    | Yes                                                                                                                                                                                                                                    |  |  |
| SSG                             | No                                                                                                                                                                                                                                     | No                                                                                                                                                                                                                                     |  |  |
| Weatherseal                     | No                                                                                                                                                                                                                                     | No                                                                                                                                                                                                                                     |  |  |
| 2 Color Option                  | No                                                                                                                                                                                                                                     | No                                                                                                                                                                                                                                     |  |  |
| Integrated Entrance Framing     | Yes                                                                                                                                                                                                                                    | Yes                                                                                                                                                                                                                                    |  |  |
| Windows Integration             | No                                                                                                                                                                                                                                     | No                                                                                                                                                                                                                                     |  |  |
| GLASSvent® Integration          | No                                                                                                                                                                                                                                     | No                                                                                                                                                                                                                                     |  |  |
| Versoleil® Sunshade Integration | Yes                                                                                                                                                                                                                                    | Yes                                                                                                                                                                                                                                    |  |  |
| Fabrication Method              | Screw Spline                                                                                                                                                                                                                           | Screw Spline                                                                                                                                                                                                                           |  |  |
| Product Description             | A 2-3/4" x 5" thermal framing system for wind-borne debris applications. It offers a center flush glazed look with either a interior structural silicone seal (wet glazed) or EPDM gasket (dry glazed) for large missile applications. | A 2-3/4" x 5" thermal framing system for wind-borne debris applications. It offers a center flush glazed look with either a interior structural silicone seal (wet glazed) or EPDM gasket (dry glazed) for large missile applications. |  |  |
| Testing for Protective Glazing  | Small Missile<br>Large Missile                                                                                                                                                                                                         | Small Missile<br>Large Missile                                                                                                                                                                                                         |  |  |
| Performance Test Standards      | AAMA 501,<br>ASTM E283, ASTM E330,<br>ASTM E331, ASTM E1886,<br>ASTM E1996,<br>TAS 201, 202, 203                                                                                                                                       | AAMA 501, AAMA 1503,<br>AAMA 1801,<br>ASTM E283, ASTM E330,<br>ASTM E331, ASTM E1886,<br>ASTM E1996,<br>CAN/CSAA440,<br>TAS 201, 202, 203                                                                                              |  |  |

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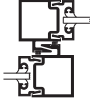
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| Product                         | InFrame® Interior Framing System (2" x 6")                                                                                                                                      | Miscellaneous Framing                                                             |  |  |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--|--|
| Catalog Section                 | Framing                                                                                                                                                                         | Framing                                                                           |  |  |
| Typical Detail                  |                                                                                                |  |  |  |
| Applications                    | Interior Framing for Partitions                                                                                                                                                 | Safety Rails<br>Glazing Moldings<br>Tubes                                         |  |  |
| Glass Plane Options             | Center                                                                                                                                                                          | —                                                                                 |  |  |
| Infill Options                  | 1/8", 1/4" & 3/8"                                                                                                                                                               | —                                                                                 |  |  |
| Glazing Options                 | Inside Glazed                                                                                                                                                                   | —                                                                                 |  |  |
| Thermal                         | No                                                                                                                                                                              | —                                                                                 |  |  |
| SSG                             | No                                                                                                                                                                              | —                                                                                 |  |  |
| Weatherseal                     | No                                                                                                                                                                              | —                                                                                 |  |  |
| 2 Color Option                  | No                                                                                                                                                                              | —                                                                                 |  |  |
| Integrated Entrance Framing     | Yes                                                                                                                                                                             | —                                                                                 |  |  |
| Windows Integration             | No                                                                                                                                                                              | —                                                                                 |  |  |
| GLASSvent® Integration          | No                                                                                                                                                                              | —                                                                                 |  |  |
| Versoleil® Sunshade Integration | No                                                                                                                                                                              | —                                                                                 |  |  |
| Fabrication Method              | Screw Spline                                                                                                                                                                    | —                                                                                 |  |  |
| Product Description             | A 2" x 6" flush glazed system for 1/4" glass. Two-piece perimeter profiles for interior framing partitions that capture drywall to simplify and speed the installation process. | Safety Rails, Glazing Moldings and Tubes.                                         |  |  |
| Testing for Protective Glazing  | —                                                                                                                                                                               | —                                                                                 |  |  |
| Performance Test Standards      |                                                                                                                                                                                 |                                                                                   |  |  |

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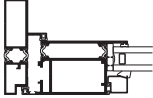
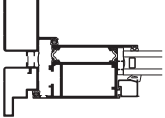
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| Product                        | 1010<br>Sliding Mall Front                                                                                                                                                                                                                                                                                      | 1010C<br>Sliding Mall Front                                                                                                                                                                                                                                                                                                                                                      | 1040<br>Sliding Mall Front                                                                                                                                                                                                                                                                                                                                                  |  |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Catalog Section                | Sliding Doors                                                                                                                                                                                                                                                                                                   | Sliding Doors                                                                                                                                                                                                                                                                                                                                                                    | Sliding Doors                                                                                                                                                                                                                                                                                                                                                               |  |
| Typical Detail                 |                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                          |  |
| Sightline                      | 1", 1-3/4", 3-7/16", 5-1/8"                                                                                                                                                                                                                                                                                     | 1-3/4", 2-5/16", 2-15/16"                                                                                                                                                                                                                                                                                                                                                        | 2-1/8", 4"                                                                                                                                                                                                                                                                                                                                                                  |  |
| Depth                          | Varies by # of panels                                                                                                                                                                                                                                                                                           | Varies by # of panels                                                                                                                                                                                                                                                                                                                                                            | 1-3/4"                                                                                                                                                                                                                                                                                                                                                                      |  |
| Applications                   | Interior                                                                                                                                                                                                                                                                                                        | Interior                                                                                                                                                                                                                                                                                                                                                                         | Interior or Exterior                                                                                                                                                                                                                                                                                                                                                        |  |
| Infill Options                 | Up to 1"                                                                                                                                                                                                                                                                                                        | 3/16" & 1/4"                                                                                                                                                                                                                                                                                                                                                                     | 1/4" & 1"                                                                                                                                                                                                                                                                                                                                                                   |  |
| Cross Rails/Muntins            | Yes                                                                                                                                                                                                                                                                                                             | Yes                                                                                                                                                                                                                                                                                                                                                                              | Yes                                                                                                                                                                                                                                                                                                                                                                         |  |
| Product Description            | The 1010 sliding mall front is a floor supported, multi-track (surface or recessed), sliding door offering parallel in-line stacking. The 1010 sliding mall front is intended to be used primarily as an interior unit. It may be used as an exterior unit when optimum weathering performance is not required. | The 1010C sliding mall front is a floor supported, multi-track (surface or recessed), sliding door offering parallel in-line stacking. The 1010C sliding mall front is intended to be used primarily as an interior unit. It may be used as an exterior unit when optimum weathering performance is not required. It accepts a swinging entrance door within the sliding panels. | The 1040 sliding mall front is a floor supported, single track (surface or recessed), sliding door offering three separate stacking options (parallel staggered, parallel even and 90° stacking). The 1040 sliding mall front is intended to be used primarily as an interior unit. It may be used as an exterior unit when optimum weathering performance is not required. |  |
| Testing for Protective Glazing | —                                                                                                                                                                                                                                                                                                               | —                                                                                                                                                                                                                                                                                                                                                                                | —                                                                                                                                                                                                                                                                                                                                                                           |  |
| Performance Class/Rating       | —                                                                                                                                                                                                                                                                                                               | —                                                                                                                                                                                                                                                                                                                                                                                | —                                                                                                                                                                                                                                                                                                                                                                           |  |
| Performance Test Standards     | —                                                                                                                                                                                                                                                                                                               | —                                                                                                                                                                                                                                                                                                                                                                                | —                                                                                                                                                                                                                                                                                                                                                                           |  |

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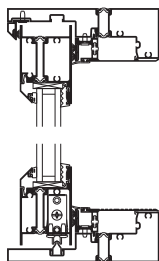
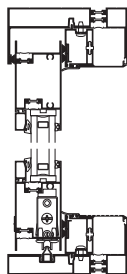
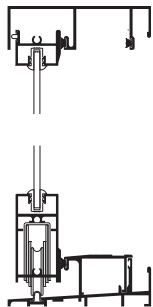
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| Product                        | 2000T<br>Terrace Doors<br>4" Frame                                                                                                                                                                                                                                          | 2000T<br>Terrace Doors<br>5" Frame                                                                                                                                                                                                                                                                                                                     |  |  |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Catalog Section                | Entrances                                                                                                                                                                                                                                                                   | Entrances                                                                                                                                                                                                                                                                                                                                              |  |  |
| Typical Detail                 |                                                                                                                                                                                            |                                                                                                                                                                                                                                                                       |  |  |
| Sightline                      | 3-3/4"                                                                                                                                                                                                                                                                      | 3-3/4"                                                                                                                                                                                                                                                                                                                                                 |  |  |
| Depth                          | 2-1/4"                                                                                                                                                                                                                                                                      | 2-1/4"                                                                                                                                                                                                                                                                                                                                                 |  |  |
| Applications                   | Exterior Balconies                                                                                                                                                                                                                                                          | Exterior Balconies                                                                                                                                                                                                                                                                                                                                     |  |  |
| Infill Options                 | Up to 1-1/16"                                                                                                                                                                                                                                                               | Up to 1-1/16"                                                                                                                                                                                                                                                                                                                                          |  |  |
| Cross Rails/Muntins            | No                                                                                                                                                                                                                                                                          | No                                                                                                                                                                                                                                                                                                                                                     |  |  |
| Thermal                        | IsoWeb®                                                                                                                                                                                                                                                                     | IsoWeb® Door Panel<br>IsoLock® Pour & Debridge Frame                                                                                                                                                                                                                                                                                                   |  |  |
| 2 Color Option                 | Yes                                                                                                                                                                                                                                                                         | No                                                                                                                                                                                                                                                                                                                                                     |  |  |
| Product Description            | A thermally broken high performance French door for use in condominiums, lofts, hotels, and apartments. Mitered corner construction with heavy duty corner clips, stainless steel locking hardware, designed to meet the code requirements of wind-borne debris protection. | A thermally broken high performance French door for use in condominiums, lofts, hotels, and apartments. Mitered corner construction with heavy duty corner clips, stainless steel locking hardware, designed to meet the code requirements of wind-borne debris protection. Integrates with MetroView® FG 501T and MetroView® FG 601T PG Window Walls. |  |  |
| Testing for Protective Glazing | Small Missile<br>Large Missile                                                                                                                                                                                                                                              | —                                                                                                                                                                                                                                                                                                                                                      |  |  |
| Performance Class/Rating       | Single: AW-PG90-ATD<br>Pairs: AW-PG45/65-ATD                                                                                                                                                                                                                                | Single: AW-PG90-ATD<br>Pairs: AW-PG45/65-ATD                                                                                                                                                                                                                                                                                                           |  |  |
| Performance Test Standards     | AAMA 507<br>ASTM E90<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>ASTM E547<br>ASTM E1886<br>ASTM E1996<br>NAFS-08<br>NFRC 100/200/500<br>TAS 201, 202, 203                                                                                                                    | AAMA 507<br>ASTM E90<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>ASTM E547<br>ASTM E1886<br>ASTM E1996<br>NAFS-11<br>NFRC 100/200/500<br>TAS 201, 202, 203                                                                                                                                                                                               |  |  |

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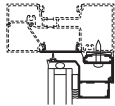
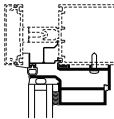
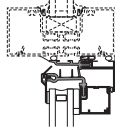


| Product                        | AA® 3200 Thermal Sliding Doors                                                                                                                                                                                                                                                                                                                                                                         | AA®3200M Thermal Sliding Doors                                                                                                                                                                                                                                                                                                                                                    | 990 Sliding Doors                                                                                                                                                                          |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Catalog Section                | Sliding Doors                                                                                                                                                                                                                                                                                                                                                                                          | Sliding Doors                                                                                                                                                                                                                                                                                                                                                                     | Sliding Doors                                                                                                                                                                              |
| Typical Detail                 |                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                 |                                                                                                         |
| Sightline                      | 4-1/4"                                                                                                                                                                                                                                                                                                                                                                                                 | Sliding Panel – 3.75"<br>Interlock – 3.75"<br>Frame – 2.375"                                                                                                                                                                                                                                                                                                                      | 1-1/8", 1-3/4", 3-1/8", 5-1/8"                                                                                                                                                             |
| Depth                          | 6-3/4"                                                                                                                                                                                                                                                                                                                                                                                                 | 5"                                                                                                                                                                                                                                                                                                                                                                                | 4-1/2"                                                                                                                                                                                     |
| Applications                   | Exterior                                                                                                                                                                                                                                                                                                                                                                                               | Exterior                                                                                                                                                                                                                                                                                                                                                                          | Exterior                                                                                                                                                                                   |
| Infill Options                 | 1" and 1-5/16"                                                                                                                                                                                                                                                                                                                                                                                         | 1"                                                                                                                                                                                                                                                                                                                                                                                | Up to 1"                                                                                                                                                                                   |
| Cross Rails/Muntins            | No                                                                                                                                                                                                                                                                                                                                                                                                     | No                                                                                                                                                                                                                                                                                                                                                                                | Yes                                                                                                                                                                                        |
| Product Description            | A monumental, high performance, sliding door for use in low, medium and high rise applications, where improved thermal performance is required. Tested to the most current North American industry standards, the AA®3200 meets performance designation of AW-135 (deflection limited to L/175) at the required gateway test unit sizes. Water penetration resistance is tested up to 15 PSF (720 Pa). | Mid-range thermal sliding door that will provide a performance / price point option compared to the AA3200. A low profile threshold option. The new thermally broken slider and frame uses our innovative IsoPour® thermal break technology. The IsoPour® thermal break technology will provide top of line thermal performance and accommodates ability for dual color finishes. | A superior operating sliding door for low, medium or high rise applications offering performance class and grades of C30, HC40 and HC60. Standard configurations are OX, XO, OXO and OXXO. |
| Thermal                        | Yes                                                                                                                                                                                                                                                                                                                                                                                                    | Yes                                                                                                                                                                                                                                                                                                                                                                               | No                                                                                                                                                                                         |
| Two Color Option               | Yes                                                                                                                                                                                                                                                                                                                                                                                                    | Yes                                                                                                                                                                                                                                                                                                                                                                               | No                                                                                                                                                                                         |
| Testing for Protective Glazing | Small Missile<br>Large Missile                                                                                                                                                                                                                                                                                                                                                                         | No                                                                                                                                                                                                                                                                                                                                                                                | No                                                                                                                                                                                         |
| Performance                    | AW-PG135-SD                                                                                                                                                                                                                                                                                                                                                                                            | AW-PG45-SD (Standard Interlocks)<br>AW-PG65-SD (Heavy Interlocks)                                                                                                                                                                                                                                                                                                                 | SGD-C30, SGD-HC40, SGD-HC60                                                                                                                                                                |
| Performance Test Standards     | AAMA 507,<br>AAMA/WDMA/CSA 101/I.S.2/A440-08,<br>ASTM E90, ASTM E283, ASTM E330,<br>ASTM E331, ASTM E547, ASTM F842,<br>ASTM E987, ASTM E1886, ASTM E1996,<br>NFRC 100/200/500,<br>TAS 201, 203                                                                                                                                                                                                        | AAMA / WDMA / CSA 101 / I.S.2 / A440 (NAFS)<br>AAMA 910<br>AAMA 1503<br>ASTM E 90<br>ASTM E 283<br>ASTM E 330<br>ASTM E 331<br>ASTM E 547<br>ASTM E 987<br>ASTM E 1332<br>ASTM E 1425<br>ASTM E 2068<br>ASTM F 842                                                                                                                                                                | AAMA 1303.5<br>AAMA/WDMA/CSA 101/I.S.2/AA440<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>ASTM E547<br>ASTM E987                                                                              |

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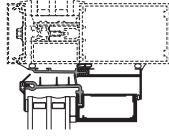
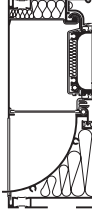
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| Product                            | GLASSvent® Windows for Storefront Framing                                                                                                                                                                                                                                                                                                                                     | GLASSvent® Windows for Curtain Wall                                                                                                                                                                                                            | GLASSvent® UT Windows (Commercial Window)                                                                                              |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Catalog Section                    | Windows - Casement / Projected                                                                                                                                                                                                                                                                                                                                                | Windows - Casement / Projected                                                                                                                                                                                                                 | Windows - Casement / Projected                                                                                                         |
| Typical Detail                     |                                                                                                                                                                                                                                                                                              |                                                                                                                                                               |                                                     |
| Grade                              | Heavy Commercial (HC)                                                                                                                                                                                                                                                                                                                                                         | Architectural Window (AW)                                                                                                                                                                                                                      | Commercial Window (CW)                                                                                                                 |
| Frame Depth                        | 2-3/16" (55.6 mm) 1/4" Infill<br>2-13/16" (71.4 mm) 1" Infill                                                                                                                                                                                                                                                                                                                 | 2-11/16" (68.3 mm) 1/4" Infill<br>3-7/16" (87.3 mm) 1" Infill                                                                                                                                                                                  | 3-1/8" (79.4 mm)<br>3-7/8" (98.4 mm)                                                                                                   |
| Functions                          | Outswing Casement<br>Project-Out                                                                                                                                                                                                                                                                                                                                              | Outswing Casement<br>Project-Out                                                                                                                                                                                                               | Outswing Casement<br>Project-Out                                                                                                       |
| Product Description                | A visually frameless operable vent designed to be used in conjunction with a variety of Kawneer storefront systems. The operable vent virtually disappears into the adjacent framing system eliminating the typical sightline buildup. Suitable for a wide variety of building applications particularly where there is need to add operable vents to existing installations. | A visually frameless operable vent designed to be used in conjunction with a variety of Kawneer curtain wall systems. Similar to the Storefront GLASSvent® with added depth to resist higher wind loads associated with multi-story buildings. | A ultra thermal, visually frameless operable vent designed to be used in conjunction with Kawneer curtain wall and storefront systems. |
| Infill Options                     | 1/4" and 1"                                                                                                                                                                                                                                                                                                                                                                   | 1/4" and 1"                                                                                                                                                                                                                                    | 1" and 1-3/4"                                                                                                                          |
| Factory Glazing                    | Silicone Glazed                                                                                                                                                                                                                                                                                                                                                               | Silicone Glazed                                                                                                                                                                                                                                | Silicone Glazed                                                                                                                        |
| Access Panels with Venetian Blinds | No                                                                                                                                                                                                                                                                                                                                                                            | No                                                                                                                                                                                                                                             | No                                                                                                                                     |
| Muntins                            | No                                                                                                                                                                                                                                                                                                                                                                            | No                                                                                                                                                                                                                                             | No                                                                                                                                     |
| Testing for Protective Glazing     | ---                                                                                                                                                                                                                                                                                                                                                                           | ---                                                                                                                                                                                                                                            | ---                                                                                                                                    |
| Performance Test Standards         | ANSI/AAMA/NWWD 101/I.S.2/NAFS                                                                                                                                                                                                                                                                                                                                                 | ANSI/AAMA/NWWD 101/I.S.2/NAFS                                                                                                                                                                                                                  | ANSI/AAMA/NWWD 101/I.S.2/NAFS<br>ASTM E283<br>ASTM E330<br>ASTM E331                                                                   |

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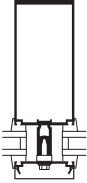
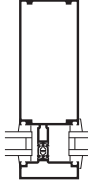
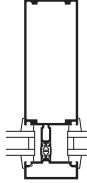
| Product                            | GLASSvent® UT Windows<br>(Architectural Window)                                                                                                                                     | 512 Ventrow Thermal Ventilator                                                                                                                                                                        |  |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Catalog Section                    | Windows - Casement / Projected                                                                                                                                                      | Windows - Window Accessories                                                                                                                                                                          |  |
| Typical Detail                     |                                                                                                    |                                                                                                                     |  |
| Grade                              | Architectural Window (AW)                                                                                                                                                           | N/A                                                                                                                                                                                                   |  |
| Frame Depth                        | 4-3/8" (111.1 mm)<br>5-1/8" (130.2 mm)                                                                                                                                              | 3-19/32" (91.2 mm)                                                                                                                                                                                    |  |
| Functions                          | Outswing Casement<br>Project-Out                                                                                                                                                    | Horizontal Ventilator                                                                                                                                                                                 |  |
| Product Description                | A ultra thermal, visually frameless operable vent designed to be used in conjunction with Kawneer curtain wall and storefront systems.                                              | A thermally broken horizontal ventilator used in conjunction with both storefront and curtain wall systems to provide natural air circulation when a fully functional operable window is not desired. |  |
| Infill Options                     | 1" and 1-3/4"                                                                                                                                                                       | N/A                                                                                                                                                                                                   |  |
| Factory Glazing                    | Silicone Glazed                                                                                                                                                                     | Tape Glazed                                                                                                                                                                                           |  |
| Access Panels with Venetian Blinds | No                                                                                                                                                                                  | No                                                                                                                                                                                                    |  |
| Muntins                            | No                                                                                                                                                                                  | No                                                                                                                                                                                                    |  |
| Testing for Protective Glazing     | Small Missile<br>Large Missile<br>Blast Mitigation                                                                                                                                  | No                                                                                                                                                                                                    |  |
| Performance Test Standards         | ANSI/AAMA/NWWDA 101/I.S.2/NAFS<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>ASTM E1886<br>ASTM E1996<br>ASTM F1642<br>ASTM F2912<br>GSA TS01-2003<br>TAS 201, 202, 203<br>UFC 4-010-01 | CAN/CSA-A440                                                                                                                                                                                          |  |

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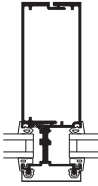
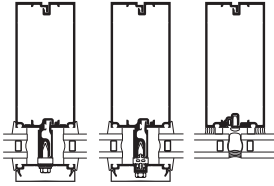
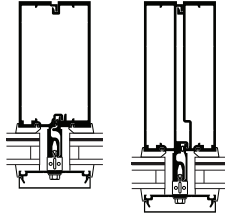


| Product                         | 1600 Wall System®1<br>Curtain Wall                                                                                                                                                                                                                 | 1600 Wall System®2<br>Curtain Wall                                                                                                   | 1600 Wall System®3<br>Curtain Wall                                                                                                                                                                                                           | 1600 Wall System®4<br>Curtain Wall                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Catalog Section                 | Curtain Wall - Traditional                                                                                                                                                                                                                         | Curtain Wall - Traditional                                                                                                           | Curtain Wall - Traditional                                                                                                                                                                                                                   | Curtain Wall - Traditional                                                                                                                                                                                          |
| Typical Detail                  |                                                                                                                                                                   |                                                     |                                                                                                                                                           |                                                                                                                                  |
| Sightline                       | 2-1/2"                                                                                                                                                                                                                                             | 2-1/2"                                                                                                                               | 2-1/2"                                                                                                                                                                                                                                       | 2-1/4"                                                                                                                                                                                                              |
| Depths                          | 6", 7-1/2"                                                                                                                                                                                                                                         | 6", 7-1/2"                                                                                                                           | 6", 7-1/2"                                                                                                                                                                                                                                   | 6", 7-1/2"                                                                                                                                                                                                          |
| Applications                    | Low to Mid-Rise                                                                                                                                                                                                                                    | Low to Mid-Rise                                                                                                                      | Low to High-Rise                                                                                                                                                                                                                             | Low to High-Rise                                                                                                                                                                                                    |
| Infill Options                  | Up to 1-1/8"                                                                                                                                                                                                                                       | Up to 1"                                                                                                                             | Up to 1"                                                                                                                                                                                                                                     | Up to 1"                                                                                                                                                                                                            |
| Glazing Options                 | Outside Glazed                                                                                                                                                                                                                                     | Outside Glazed                                                                                                                       | Inside Glazed<br>Outside Glazed                                                                                                                                                                                                              | Inside Glazed<br>Outside Glazed                                                                                                                                                                                     |
| Thermal                         | Silicone Compatible<br>Elastomer,<br>Fiberglass Pressure Plate<br>Available                                                                                                                                                                        | Silicone Compatible<br>Elastomer,<br>Fiberglass Pressure Plate<br>Available                                                          | IsoStrut®                                                                                                                                                                                                                                    | IsoStrut® or Optional<br>IsoLock®<br>Pour and Debridge                                                                                                                                                              |
| SSG                             | No                                                                                                                                                                                                                                                 | Yes                                                                                                                                  | Optional                                                                                                                                                                                                                                     | No                                                                                                                                                                                                                  |
| 2 Color Option                  | Yes                                                                                                                                                                                                                                                | Yes                                                                                                                                  | Yes                                                                                                                                                                                                                                          | Yes                                                                                                                                                                                                                 |
| Integrated Entrance Framing     | Yes                                                                                                                                                                                                                                                | Yes                                                                                                                                  | No                                                                                                                                                                                                                                           | No                                                                                                                                                                                                                  |
| Windows Integration             | Yes                                                                                                                                                                                                                                                | Yes                                                                                                                                  | Yes                                                                                                                                                                                                                                          | Yes                                                                                                                                                                                                                 |
| GLASSvent® Integration          | Yes                                                                                                                                                                                                                                                | Yes                                                                                                                                  | Yes                                                                                                                                                                                                                                          | Yes                                                                                                                                                                                                                 |
| Versoleil® Sunshade Integration | Yes                                                                                                                                                                                                                                                | Yes                                                                                                                                  | No                                                                                                                                                                                                                                           | No                                                                                                                                                                                                                  |
| Fabrication Method              | Shear Block                                                                                                                                                                                                                                        | Shear Block                                                                                                                          | Shear Block                                                                                                                                                                                                                                  | Shear Block<br>Screw Spline                                                                                                                                                                                         |
| Product Description             | An outside glazed pressure wall that is designed to easily integrate with 1600 Wall System®2. It is ideal for low to mid-rise curtain wall applications where high performance is desired. It is also the right choice for high-span applications. | A silicone glazed ribbon window system that eliminates exterior vertical covers and offers fast "stick" erection and inside glazing. | An inside/outside glazed pressure wall that utilizes the IsoStrut® thermal break on the vertical mullion. This provides superior structural and thermal performance. Spandrel glazing and/or re-glazing is easily handled from the exterior. | A lower profile pressure wall that utilizes the IsoStrut® thermal break for superior structural and thermal performance. A 6" ribbon window version is available with the IsoLock® Pour and Debridge Thermal Break. |
| Testing for Protective Glazing  | Small Missile, Large Missile, Blast Mitigation                                                                                                                                                                                                     | Small Missile<br>Large Missile                                                                                                       | —                                                                                                                                                                                                                                            | —                                                                                                                                                                                                                   |
| Performance Test Standards      | AAMA 501.1, AAMA 501.4, AAMA 501.6, AAMA 507, AAMA 1503, ASTM E90, ASTM E283, ASTM E330, ASTM E331, ASTM F1642, ASTM E1886, ASTM E1996, CSA-A440-00, NFRC 100/200/500, TAS 201, 202, 203, UFC 4-010-01                                             | AAMA 501.1, AAMA 501.4, AAMA 501.6, AAMA 507, AAMA 1503, ASTM E90, ASTM E283, ASTM E330, ASTM E331, CSA-A440, NFRC 100/200/500       | AAMA 501.1, AAMA 507, AAMA 1503, ASTM E283, ASTM E330, ASTM E331, NFRC 100/200/500                                                                                                                                                           | AAMA 501.1, AAMA 507, AAMA 1503, ASTM E283, ASTM E330, ASTM E331, NFRC 100/200/500                                                                                                                                  |

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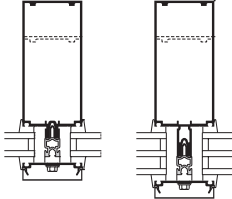
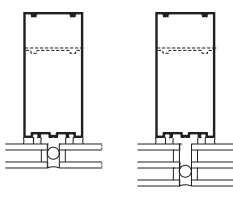
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| Product                         | 1600 Wall System®5<br>Curtain Wall                                                                                                                 | 1600 SS<br>Curtain Wall System                                                                                                                                                                                                                        | 1630 SS IR<br>Curtain Wall System                                                                                                                                                                                                                                                               |  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Catalog Section                 | Curtain Wall - Traditional                                                                                                                         | Curtain Wall - Traditional                                                                                                                                                                                                                            | Curtain Wall - Traditional                                                                                                                                                                                                                                                                      |  |
| Typical Detail                  |                                                                   |                                                                                                                                                                      |                                                                                                                                                                                                              |  |
| Sightline                       | 2-1/2"                                                                                                                                             | 2-1/2"                                                                                                                                                                                                                                                | 3"                                                                                                                                                                                                                                                                                              |  |
| Depths                          | 6", 7-1/2"                                                                                                                                         | 6", 7-1/2"                                                                                                                                                                                                                                            | 7-13/16", 8-13/16"                                                                                                                                                                                                                                                                              |  |
| Applications                    | Low to High-Rise                                                                                                                                   | Low to Mid-Rise                                                                                                                                                                                                                                       | Low to Mid-Rise                                                                                                                                                                                                                                                                                 |  |
| Infill Options                  | Up to 1"                                                                                                                                           | Up to 1-1/8"                                                                                                                                                                                                                                          | 1-5/16"                                                                                                                                                                                                                                                                                         |  |
| Glazing Options                 | Inside Glazed                                                                                                                                      | Outside Glazed                                                                                                                                                                                                                                        | Outside Glazed                                                                                                                                                                                                                                                                                  |  |
| Thermal                         | Isolator Clip                                                                                                                                      | Silicone Compatible Elastomer                                                                                                                                                                                                                         | Silicone Compatible Elastomer                                                                                                                                                                                                                                                                   |  |
| SSG                             | Optional                                                                                                                                           | Optional                                                                                                                                                                                                                                              | No                                                                                                                                                                                                                                                                                              |  |
| 2 Color Option                  | Yes                                                                                                                                                | Yes                                                                                                                                                                                                                                                   | Yes                                                                                                                                                                                                                                                                                             |  |
| Integrated Entrance Framing     | Yes                                                                                                                                                | Yes                                                                                                                                                                                                                                                   | Yes                                                                                                                                                                                                                                                                                             |  |
| Windows Integration             | Yes                                                                                                                                                | Yes                                                                                                                                                                                                                                                   | Yes                                                                                                                                                                                                                                                                                             |  |
| GLASSvent® Integration          | Yes                                                                                                                                                | Yes                                                                                                                                                                                                                                                   | No                                                                                                                                                                                                                                                                                              |  |
| Versoleil® Sunshade Integration | Yes                                                                                                                                                | Yes                                                                                                                                                                                                                                                   | Yes                                                                                                                                                                                                                                                                                             |  |
| Fabrication Method              | Screw Spline - Type A<br>Screw Spline - Type B<br>Shear Block                                                                                      | Screw Spline                                                                                                                                                                                                                                          | Screw Spline                                                                                                                                                                                                                                                                                    |  |
| Product Description             | A high performance ribbon window or curtain wall system. Male/Female split vertical mullion option available for easier assembly and installation. | An outside glazed pressure wall that is designed to be fabricated and assembled in the shop. It is ideal for low to mid-rise curtain wall applications where high performance is desired. Also available in a pre-glazed version - 1600 SS Unitwall®. | A high performance outside glazed curtain wall that has been tested at high structural load pressures and meets high velocity impact zone product approval requirements. With screw-spline architecture and both dry and wet glazing options available, 1630 SS IR is easy and fast to install. |  |
| Testing for Protective Glazing  | —                                                                                                                                                  | Blast Mitigation                                                                                                                                                                                                                                      | Small Missile, Large Missile, Blast Mitigation                                                                                                                                                                                                                                                  |  |
| Performance Test Standards      | AAMA 501.1<br>AAMA 501.4<br>AAMA 507<br>AAMA 1503<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>ASTM E1425<br>NFRC 100/200/500                         | AAMA 501.1, AAMA 501.4,<br>AAMA 507, AAMA 1503,<br>AAMA 1801, ASTM E90,<br>ASTM E283, ASTM E330,<br>ASTM E331, ASTM E1425,<br>ASTM F1642,<br>CSA-A440,<br>NFRC 100/200/500,<br>UFC 4-010-01                                                           | AAMA 501.1, AAMA 507,<br>AAMA 1503, AAMA 1801,<br>ASTM E90, ASTM E283,<br>ASTM E330, ASTM E331,<br>ASTM E1425, ASTM E1886,<br>ASTM E1996, ASTM F1642,<br>CSA-A440, UFC 4-010-01,<br>NFRC 100/200/500,<br>TAS 201, 202, 203                                                                      |  |

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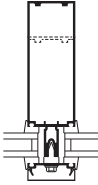
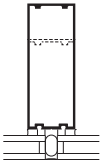
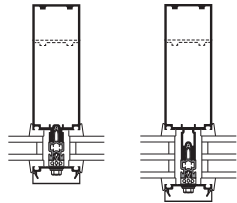
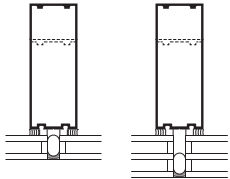
| Product                         | 1600UT System®1<br>Curtain Wall                                                                                                                                                                                                                                                                   | 1600UT System®2<br>Curtain Wall                                                                                                                                                                                                                                                                                                                                   |  |  |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Catalog Section                 | Curtain Wall - Traditional                                                                                                                                                                                                                                                                        | Curtain Wall - Traditional                                                                                                                                                                                                                                                                                                                                        |  |  |
| Typical Detail                  |                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                  |  |  |
| Sightline                       | 2-1/2"                                                                                                                                                                                                                                                                                            | 2-1/2"                                                                                                                                                                                                                                                                                                                                                            |  |  |
| Depths                          | 6" and 7-1/2" (Double Glazed)<br>6-3/4" and 8-1/4" (Triple Glazed)                                                                                                                                                                                                                                | 6" and 7-1/2" (Double Glazed)<br>6-3/4" and 8-1/4" (Triple Glazed)                                                                                                                                                                                                                                                                                                |  |  |
| Applications                    | Low to Mid-Rise                                                                                                                                                                                                                                                                                   | Low to Mid-Rise                                                                                                                                                                                                                                                                                                                                                   |  |  |
| Infill Options                  | 1", 1-1/4", 1-5/16", and 1-3/4"                                                                                                                                                                                                                                                                   | 1", 1-1/4", 1-5/16", and 1-3/4"                                                                                                                                                                                                                                                                                                                                   |  |  |
| Glazing Options                 | Outside Glazed                                                                                                                                                                                                                                                                                    | Outside Glazed                                                                                                                                                                                                                                                                                                                                                    |  |  |
| Thermal                         | Engineered Polymer Separator                                                                                                                                                                                                                                                                      | Engineered Polymer Separator                                                                                                                                                                                                                                                                                                                                      |  |  |
| SSG                             | No                                                                                                                                                                                                                                                                                                | Yes                                                                                                                                                                                                                                                                                                                                                               |  |  |
| 2 Color Option                  | Yes                                                                                                                                                                                                                                                                                               | Yes                                                                                                                                                                                                                                                                                                                                                               |  |  |
| Integrated Entrance Framing     | Yes                                                                                                                                                                                                                                                                                               | Yes                                                                                                                                                                                                                                                                                                                                                               |  |  |
| Windows Integration             | Yes                                                                                                                                                                                                                                                                                               | Yes                                                                                                                                                                                                                                                                                                                                                               |  |  |
| GLASSvent® UT Integration       | Yes                                                                                                                                                                                                                                                                                               | Yes                                                                                                                                                                                                                                                                                                                                                               |  |  |
| Versoleil® Sunshade Integration | Yes                                                                                                                                                                                                                                                                                               | No                                                                                                                                                                                                                                                                                                                                                                |  |  |
| Fabrication Method              | Shear Block                                                                                                                                                                                                                                                                                       | Shear Block                                                                                                                                                                                                                                                                                                                                                       |  |  |
| Product Description             | High thermal performance curtain wall system with excellent condensation resistance. Accommodates 1", 1-1/4" and 1-5/16" double and 1-3/4" triple glazing. Full integration with Kawneer's high performing entrance and window products. Ideal for low rise, mid rise and high-span applications. | Vertical two-sided structural silicone glazed (SSG) curtain wall system with high thermal performance and excellent condensation resistance. Accommodates 1", 1-1/4" and 1-5/16" double and 1-3/4" triple glazing. Full integration with Kawneer's high thermal performing entrance and window products. Ideal for low rise, mid rise and high-span applications. |  |  |
| Testing for Protective Glazing  | Storm Shelter, Blast Mitigation, Human Impact                                                                                                                                                                                                                                                     | —                                                                                                                                                                                                                                                                                                                                                                 |  |  |
| Performance Test Standards      | AAMA 501, AAMA 501.1, AAMA 501.4, AAMA 501.5, AAMA 501.6, AAMA 501.8, AAMA 507, AAMA 520, AAMA 1801, AAMA 1503, ASTM E90, ASTM E283, ASTM E330, ASTM E331, ASTM E1425, ASTM F1642, ASTM F2912, CSA-A440, ICC 500, NFRC 100/200/500, TAS 202, GSA-TS01-2003                                        | AAMA 501, AAMA 501.1, AAMA 501.4, AAMA 501.5, AAMA 501.6, AAMA 507, AAMA 520, AAMA 1801, ASTM E90, ASTM E330, ASTM E283, ASTM E331, ASTM E1425, TAS 202, NFRC 100/200/500                                                                                                                                                                                         |  |  |

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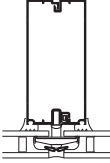
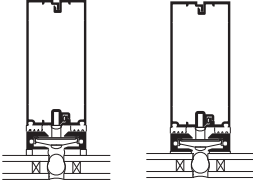
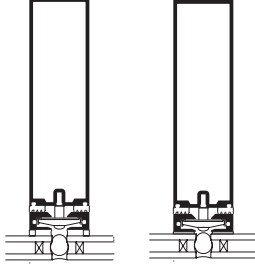
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| Product                                      | 1620<br>Curtain Wall System                                                                                                                                                                                                                                               | 1620 SSG<br>Curtain Wall System                                                                                                                                                                                                                        | 1620UT<br>Curtain Wall System                                                                                                                                                                                                                                                                                                    | 1620UT SSG<br>Curtain Wall System                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Catalog Section                              | Curtain Wall - Traditional                                                                                                                                                                                                                                                | Curtain Wall - Traditional                                                                                                                                                                                                                             | Curtain Wall - Traditional                                                                                                                                                                                                                                                                                                       | Curtain Wall - Traditional                                                                                                                                                                                                                                                                                                                               |
| Typical Detail                               |                                                                                                                                                                                          |                                                                                                                                                                       |                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                       |
| Sightline                                    | 2"                                                                                                                                                                                                                                                                        | 2"                                                                                                                                                                                                                                                     | 2"                                                                                                                                                                                                                                                                                                                               | 2"                                                                                                                                                                                                                                                                                                                                                       |
| Depths                                       | 6", 7-1/2"                                                                                                                                                                                                                                                                | 6", 7-1/2"                                                                                                                                                                                                                                             | 6" and 7-1/2" (Double Glazed)<br>6-3/4" and 8-1/4" (Triple Glazed)                                                                                                                                                                                                                                                               | 6" and 7-1/2" (Double Glazed)<br>6-3/4" and 8-1/4" (Triple Glazed)                                                                                                                                                                                                                                                                                       |
| Applications                                 | Low to Mid-Rise                                                                                                                                                                                                                                                           | Low to Mid-Rise                                                                                                                                                                                                                                        | Low to Mid-Rise                                                                                                                                                                                                                                                                                                                  | Low to Mid-Rise                                                                                                                                                                                                                                                                                                                                          |
| Infill Options                               | 1/4" and 1"                                                                                                                                                                                                                                                               | 1/4" and 1"                                                                                                                                                                                                                                            | 1/4", 1" and 1-3/4"                                                                                                                                                                                                                                                                                                              | 1/4", 1" and 1-3/4"                                                                                                                                                                                                                                                                                                                                      |
| Glazing Options                              | Outside Glazed                                                                                                                                                                                                                                                            | Outside Glazed                                                                                                                                                                                                                                         | Outside Glazed                                                                                                                                                                                                                                                                                                                   | Outside Glazed                                                                                                                                                                                                                                                                                                                                           |
| Thermal                                      | Silicone Compatible Elastomer,<br>Fiberglass Pressure Plate                                                                                                                                                                                                               | Silicone Compatible Elastomer,<br>Fiberglass Pressure Plate                                                                                                                                                                                            | Engineered Polymer Separator<br>Fiberglass Pressure Plate                                                                                                                                                                                                                                                                        | Engineered Polymer Separator<br>Fiberglass Pressure Plate                                                                                                                                                                                                                                                                                                |
| SSG                                          | No                                                                                                                                                                                                                                                                        | Yes                                                                                                                                                                                                                                                    | No                                                                                                                                                                                                                                                                                                                               | Yes                                                                                                                                                                                                                                                                                                                                                      |
| 2 Color Option                               | Yes                                                                                                                                                                                                                                                                       | Yes                                                                                                                                                                                                                                                    | Yes                                                                                                                                                                                                                                                                                                                              | Yes                                                                                                                                                                                                                                                                                                                                                      |
| Integrated Entrance Framing                  | Yes                                                                                                                                                                                                                                                                       | Yes                                                                                                                                                                                                                                                    | Yes                                                                                                                                                                                                                                                                                                                              | Yes                                                                                                                                                                                                                                                                                                                                                      |
| Windows Integration                          | Yes                                                                                                                                                                                                                                                                       | Yes                                                                                                                                                                                                                                                    | Yes                                                                                                                                                                                                                                                                                                                              | Yes                                                                                                                                                                                                                                                                                                                                                      |
| GLASSvent® /<br>GLASSvent® UT<br>Integration | Yes<br>(1" Double Glazing Only)                                                                                                                                                                                                                                           | Yes<br>(1" Double Glazing Only)                                                                                                                                                                                                                        | Yes                                                                                                                                                                                                                                                                                                                              | Yes                                                                                                                                                                                                                                                                                                                                                      |
| Versoleil® Sunshade<br>Integration           | No                                                                                                                                                                                                                                                                        | No                                                                                                                                                                                                                                                     | No                                                                                                                                                                                                                                                                                                                               | No                                                                                                                                                                                                                                                                                                                                                       |
| Fabrication Method                           | Shear Block                                                                                                                                                                                                                                                               | Shear Block                                                                                                                                                                                                                                            | Shear Block                                                                                                                                                                                                                                                                                                                      | Shear Block                                                                                                                                                                                                                                                                                                                                              |
| Product Description                          | An outside glazed Curtain wall system that is designed to easily integrate with 1620 SSG. It has 2" narrow sightline, accommodate 1/4" and 1" glazing. Ideal for low to mid-rise curtain wall applications. Full integration with Kawneer's entrance and window products. | Structural silicone glazed (SSG) curtain wall system with 2" narrow sightline and accommodates 1/4" and 1" glazing. Ideal for low to mid-rise curtain-wall applications. Full integration with Kawneer's high performing entrance and window products. | A High-Thermal Performance outside glazed curtain wall system with excellent condensation resistance. It has 2" narrow sightline and accommodates 1/4", 1" and 1-3/4" glazing. Ideal for low to mid-rise curtain-wall applications. Full integration with Kawneer's high performing entrance and window products and 1620UT SSG. | Vertical two-sided structural silicone glazed (SSG) curtain wall system with high thermal performance and excellent condensation resistance. It has 2" narrow sightline and accommodates 1/4", 1" and 1-3/4" glazing. Ideal for low to mid-rise curtain-wall applications. Full integration with Kawneer's high performing entrance and window products. |
| Testing for Protective Glazing               | —                                                                                                                                                                                                                                                                         | —                                                                                                                                                                                                                                                      | —                                                                                                                                                                                                                                                                                                                                | —                                                                                                                                                                                                                                                                                                                                                        |
| Performance Test Standards                   | AAMA 501, AAMA 501.5, AAMA 507, AAMA 520, AAMA 1503, AAMA 1801, ASTM E90, ASTM E283, ASTM E330, ASTM E331, ASTM E1425, CSA-A440, TAS 202, NFRC 100/200/500                                                                                                                | AAMA 501, AAMA 501.5, AAMA 507, AAMA 520, AAMA 1801, ASTM E90, ASTM E330, ASTM E283, ASTM E331, ASTM E1425, CSA-A440, NFRC 100/200/500, TAS 202                                                                                                        | AAMA 501, AAMA 501.4, AAMA 501.5, AAMA 501.6, AAMA 507, AAMA 520, AAMA 1503, AAMA 1801, ASTM E90, ASTM E283, ASTM E330, ASTM E331, ASTM E1425, CSA-A440, TAS 202, NFRC 100/200/500                                                                                                                                               | AAMA 501, AAMA 501.4, AAMA 501.5, AAMA 501.6, AAMA 507, AAMA 520, AAMA 1503, AAMA 1801, ASTM E90, ASTM E283, ASTM E330, ASTM E331, ASTM E1425, CSA-A440, TAS 202, NFRC 100/200/500                                                                                                                                                                       |

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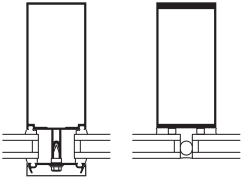
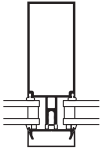
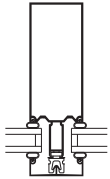
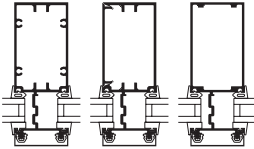
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| Product                                                | Clearwall® SS<br>Curtain Wall System                                                                                                                                                                                                                                                              | Clearwall® SSI<br>Clearwall® SSIT<br>Curtain Wall Systems                                                                                                                                                                                              | Clearwall® SB<br>Curtain Wall System                                                                                                                                                                                                                                                                                    | Clearwall® SBI<br>Clearwall® SBIT<br>Curtain Wall Systems                                                                                                                                                                                                                    |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Catalog Section                                        | Curtain Wall - Traditional                                                                                                                                                                                                                                                                        | Curtain Wall - Traditional                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                              |
| Typical Detail                                         |                                                                                                                                                                                                                  |                                                                                                                                                                       |                                                                                                                                                                                                                                       |                                                                                                                                                                                           |
| Sightline                                              | (2-1/2") Flush Glass Exterior                                                                                                                                                                                                                                                                     | (2-1/2") Flush Glass Exterior                                                                                                                                                                                                                          | (2-1/2") Flush Glass Exterior                                                                                                                                                                                                                                                                                           | (2-1/2") Flush Glass Exterior                                                                                                                                                                                                                                                |
| Depths                                                 | 5-1/8", 6-5/8"                                                                                                                                                                                                                                                                                    | SSI - 6", 7-1/2"<br>SSIT - 5-7/8", 7-3/8"                                                                                                                                                                                                              | SB - 10-1/8"                                                                                                                                                                                                                                                                                                            | SBI - 11"<br>SBIT - 10-27/32"                                                                                                                                                                                                                                                |
| Applications                                           | Low Rise                                                                                                                                                                                                                                                                                          | Low Rise                                                                                                                                                                                                                                               | Low Rise                                                                                                                                                                                                                                                                                                                | Low Rise                                                                                                                                                                                                                                                                     |
| Infill Options                                         | 1-1/8"                                                                                                                                                                                                                                                                                            | 1"                                                                                                                                                                                                                                                     | 1-1/8"                                                                                                                                                                                                                                                                                                                  | 1"                                                                                                                                                                                                                                                                           |
| Glazing Options                                        | Outside Glazed                                                                                                                                                                                                                                                                                    | Outside Glazed                                                                                                                                                                                                                                         | Outside Glazed                                                                                                                                                                                                                                                                                                          | Outside Glazed                                                                                                                                                                                                                                                               |
| Thermal                                                | ABS Base on Toggles                                                                                                                                                                                                                                                                               | ABS Base on Toggles                                                                                                                                                                                                                                    | ABS Base on Toggles                                                                                                                                                                                                                                                                                                     | ABS Base on Toggles                                                                                                                                                                                                                                                          |
| Structural Silicone Glazed (SSG) or Toggle Glazed (TG) | Toggle Glazed (TG) with recessed spacer, insulating glass unit.                                                                                                                                                                                                                                   | Toggle Glazed with metal interface attached to insulating glass unit, using Structural Silicone or 3M® VHB® Structural Glazing Tape.                                                                                                                   | Toggle Glazed (TG) with recessed spacer, insulating glass unit.                                                                                                                                                                                                                                                         | Toggle Glazed with metal interface attached to insulating glass unit, using Structural Silicone or 3M® VHB® Structural Glazing Tape.                                                                                                                                         |
| 2 Color Option                                         | Yes                                                                                                                                                                                                                                                                                               | Yes                                                                                                                                                                                                                                                    | Yes                                                                                                                                                                                                                                                                                                                     | Yes                                                                                                                                                                                                                                                                          |
| Integrated Entrance Framing                            | Yes                                                                                                                                                                                                                                                                                               | Yes                                                                                                                                                                                                                                                    | Yes                                                                                                                                                                                                                                                                                                                     | Yes                                                                                                                                                                                                                                                                          |
| Windows Integration                                    | No                                                                                                                                                                                                                                                                                                | No                                                                                                                                                                                                                                                     | No                                                                                                                                                                                                                                                                                                                      | No                                                                                                                                                                                                                                                                           |
| GLASSvent® Integration                                 | No                                                                                                                                                                                                                                                                                                | No                                                                                                                                                                                                                                                     | No                                                                                                                                                                                                                                                                                                                      | No                                                                                                                                                                                                                                                                           |
| Versoleil® Sunshade Integration                        | No                                                                                                                                                                                                                                                                                                | No                                                                                                                                                                                                                                                     | No                                                                                                                                                                                                                                                                                                                      | No                                                                                                                                                                                                                                                                           |
| Fabrication Method                                     | Screw Spline                                                                                                                                                                                                                                                                                      | Screw Spline                                                                                                                                                                                                                                           | Shear Block                                                                                                                                                                                                                                                                                                             | Shear Block                                                                                                                                                                                                                                                                  |
| Product Description                                    | An outside glazed 4-sided curtain wall system, which uses an innovative toggle assembly to mechanically capture glass with recessed spacer, eliminating the need for any structural silicone. Ideal for low rise curtain wall applications where an uninterrupted all-glass aesthetic is desired. | An outside glazed 4-sided curtain wall system, which uses an innovative toggle assembly to mechanically capture metal interface attached to glass. Ideal for low rise curtain wall applications where an uninterrupted all-glass aesthetic is desired. | An outside glazed 4-sided curtain wall system, which uses an innovative toggle assembly to mechanically capture glass with recessed spacer, eliminating the need for any structural silicone. Ideal for low rise curtain wall applications where an uninterrupted all-glass aesthetic when high free spans are desired. | An outside glazed 4-sided curtain wall system, which uses an innovative toggle assembly to mechanically capture metal interface attached to glass. Ideal for low rise curtain wall applications where an uninterrupted all-glass aesthetic when high free spans are desired. |
| Testing for Protective Glazing                         | —                                                                                                                                                                                                                                                                                                 | Small Missile<br>Large Missile                                                                                                                                                                                                                         | —                                                                                                                                                                                                                                                                                                                       | —                                                                                                                                                                                                                                                                            |
| Performance Test Standards                             | AAMA 501, AAMA 501.1, AAMA 501.4, AAMA 501.5, AAMA 507, AAMA 520, AAMA 1503, ASTM E90, ASTM E283, ASTM E330, ASTM E331, ASTM E1425, CSA-A440, NFRC 100/200/500, TAS 202                                                                                                                           | AAMA 501, AAMA 501.1, AAMA 501.4, AAMA 501.5, AAMA 507, AAMA 520, AAMA 1503, ASTM E90, ASTM E283, ASTM E330, ASTM E331, ASTM E1425, ASTM E1886, ASTM E1996, CSA-A440, NFRC 100/200/500, TAS 201, 202, 203                                              | Refer to Clearwall® SS performance standards                                                                                                                                                                                                                                                                            | Refer to Clearwall® SSI and SSIT performance standards                                                                                                                                                                                                                       |

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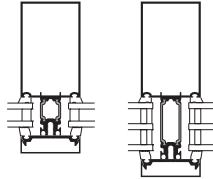
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| Product                         | 1600 LR Wall®<br>Curtain Wall System                                                                                                                                     | 1602 Wall System                                                                                                                                                                          | 2250 L-R<br>Wall System                                                                                                                                                                                                                                                                                                                                    | 2250 IG<br>Curtain Wall System                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Catalog Section                 | Curtain Wall - Traditional                                                                                                                                               | Curtain Wall - Traditional                                                                                                                                                                | Curtain Wall - Traditional                                                                                                                                                                                                                                                                                                                                 | Curtain Wall - Traditional                                                                                                                                                                                                                                                                  |
| Typical Detail                  |                                                                                         |                                                                                                          |                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                          |
| Sightline                       | 2-1/2"                                                                                                                                                                   | 2"                                                                                                                                                                                        | 2-1/4"                                                                                                                                                                                                                                                                                                                                                     | 2-1/4"                                                                                                                                                                                                                                                                                      |
| Depths                          | 5-3/4", 7-1/4"                                                                                                                                                           | 5", 6"                                                                                                                                                                                    | 4-1/4", 5", 6-1/2", 7-1/4"                                                                                                                                                                                                                                                                                                                                 | 4-1/2", 6", 7-1/2"                                                                                                                                                                                                                                                                          |
| Applications                    | Low Rise                                                                                                                                                                 | Low to Mid-Rise                                                                                                                                                                           | Low Rise                                                                                                                                                                                                                                                                                                                                                   | Low to High-Rise                                                                                                                                                                                                                                                                            |
| Infill Options                  | 1/4" and 1"                                                                                                                                                              | Up to 1"                                                                                                                                                                                  | Up to 1"                                                                                                                                                                                                                                                                                                                                                   | Up to 1"                                                                                                                                                                                                                                                                                    |
| Glazing Options                 | Outside Glazed                                                                                                                                                           | Outside Glazed                                                                                                                                                                            | Outside Glazed                                                                                                                                                                                                                                                                                                                                             | Inside Glazed                                                                                                                                                                                                                                                                               |
| Thermal                         | Silicone Compatible Elastomer                                                                                                                                            | PVC Isolator                                                                                                                                                                              | Polymer Glazing Clip                                                                                                                                                                                                                                                                                                                                       | PVC Isolator Clip                                                                                                                                                                                                                                                                           |
| SSG                             | Optional                                                                                                                                                                 | No                                                                                                                                                                                        | Optional                                                                                                                                                                                                                                                                                                                                                   | Optional                                                                                                                                                                                                                                                                                    |
| 2 Color Option                  | Yes                                                                                                                                                                      | Yes                                                                                                                                                                                       | Yes                                                                                                                                                                                                                                                                                                                                                        | Yes                                                                                                                                                                                                                                                                                         |
| Integrated Entrance Framing     | Yes                                                                                                                                                                      | Yes                                                                                                                                                                                       | Yes                                                                                                                                                                                                                                                                                                                                                        | No                                                                                                                                                                                                                                                                                          |
| Windows Integration             | Yes                                                                                                                                                                      | Yes                                                                                                                                                                                       | Yes                                                                                                                                                                                                                                                                                                                                                        | Yes                                                                                                                                                                                                                                                                                         |
| GLASSvent® Integration          | Yes                                                                                                                                                                      | Yes                                                                                                                                                                                       | Yes                                                                                                                                                                                                                                                                                                                                                        | Yes                                                                                                                                                                                                                                                                                         |
| Versoleil® Sunshade Integration | No                                                                                                                                                                       | No                                                                                                                                                                                        | No                                                                                                                                                                                                                                                                                                                                                         | No                                                                                                                                                                                                                                                                                          |
| Fabrication Method              | Shear Block                                                                                                                                                              | Shear Block                                                                                                                                                                               | Shear Block                                                                                                                                                                                                                                                                                                                                                | Screw Spline - Type A<br>Screw Spline - Type B<br>Shear Block                                                                                                                                                                                                                               |
| Product Description             | An economical stock length, outside glaze pressure wall system. Shear block construction utilizing concealed fasteners. Ideal for low-rise applications up to 4 stories. | An outside glazed pressure wall that is designed to be fabricated and assembled in the shop. It is ideal for low to mid-rise curtain wall applications where high performance is desired. | An economical, outside glazed, low-rise curtain wall system with versatility to be used in punched openings/ribbon windows. Accommodates 1/4" and 1" glazing. Less labor intensive stick built system. Shear block construction using concealed fasteners. Vertical SSG option. Two color capability. Integrates with GLASSvent® Windows for Curtain Wall. | An economical, internal glazed, 2-1/4" sightline curtain wall, ideal for low-to-midrise applications. Option for punched opening/ribbon window. Accommodates 1/4" and 1" glazing. Screw spline or shear block fabrication. SSG option. Integrates with GLASSvent® Windows for Curtain Wall. |
| Testing for Protective Glazing  | —                                                                                                                                                                        | —                                                                                                                                                                                         | —                                                                                                                                                                                                                                                                                                                                                          | —                                                                                                                                                                                                                                                                                           |
| Performance Test Standards      | AAMA 501.1, AAMA 501.4, AAMA 507, AAMA 1503, ASTM E283, ASTM E330, ASTM E331, ASTM E1425, NFRC 100/200/500                                                               | ASTM E283<br>ASTM E331<br>CAN3-S157<br>CAN/CSA-A440                                                                                                                                       | AAMA 501.1<br>AAMA 507<br>AAMA 1503<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>NFRC 100/200/500                                                                                                                                                                                                                                                             | AAMA 501.1<br>AAMA 507<br>AAMA 1503<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>NFRC 100/200/500                                                                                                                                                                                              |

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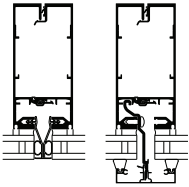
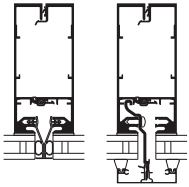
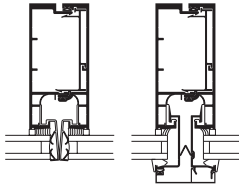
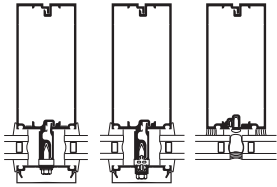
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| Product                         | 7500 Wall®<br>Curtain Wall System                                                                                                                                                                                                |  |  |  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| Catalog Section                 | Curtain Wall - Traditional                                                                                                                                                                                                       |  |  |  |
| Typical Detail                  |                                                                                                                                                 |  |  |  |
| Sightline                       | 2-1/2"                                                                                                                                                                                                                           |  |  |  |
| Depths                          | 6-5/16, 7-5/16"                                                                                                                                                                                                                  |  |  |  |
| Applications                    | Low to High-Rise                                                                                                                                                                                                                 |  |  |  |
| Infill Options                  | 1/8", 1/4", 1" and 2"                                                                                                                                                                                                            |  |  |  |
| Glazing Options                 | Outside Glazed                                                                                                                                                                                                                   |  |  |  |
| Thermal                         | IsoWeb®                                                                                                                                                                                                                          |  |  |  |
| SSG                             | No                                                                                                                                                                                                                               |  |  |  |
| 2 Color Option                  | Yes                                                                                                                                                                                                                              |  |  |  |
| Integrated Entrance Framing     | Yes                                                                                                                                                                                                                              |  |  |  |
| Windows Integration             | Yes                                                                                                                                                                                                                              |  |  |  |
| GLASSvent® Integration          | No                                                                                                                                                                                                                               |  |  |  |
| Versoleil® Sunshade Integration | No                                                                                                                                                                                                                               |  |  |  |
| Fabrication Method              | Shear Block                                                                                                                                                                                                                      |  |  |  |
| Product Description             | A high performance pressure wall system that has exceptional thermal performance and resistance to water condensation. It will accommodate 1" double or 2" triple glazing. 7500 Wall is ideal for low to high-rise applications. |  |  |  |
| Testing for Protective Glazing  | —                                                                                                                                                                                                                                |  |  |  |
| Performance Test Standards      | AAMA 507<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>ASTM E547<br>CSA-A440<br>NFRC 100/200/500                                                                                                                                     |  |  |  |

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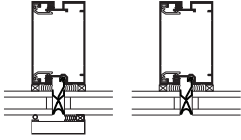
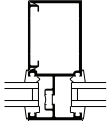
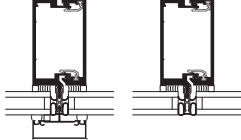
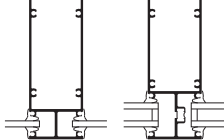
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| Product                         | 2500 UT Unitwall® System                                                                                                                                                                                                                                                                     | 2500 UT Unitwall® System - SGT                                                                                                                                                                                                                                                                                                  | 2500 PG Wall® Curtain Wall System                                                                                                                                                                                         | 1600 SS Curtain Wall System                                                                                                                                                                                                                           |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Catalog Section                 | Curtain Wall - Unitized                                                                                                                                                                                                                                                                      | Curtain Wall - Unitized                                                                                                                                                                                                                                                                                                         | Curtain Wall - Unitized                                                                                                                                                                                                   | Curtain Wall - Unitized                                                                                                                                                                                                                               |
| Typical Detail                  |                                                                                                                                                                                                             |                                                                                                                                                                                                                                                |                                                                                                                                        |                                                                                                                                                                    |
| Sightline                       | 2-1/2"                                                                                                                                                                                                                                                                                       | 2-1/2"                                                                                                                                                                                                                                                                                                                          | 2-1/2"                                                                                                                                                                                                                    | 2-1/2"                                                                                                                                                                                                                                                |
| Depths                          | 6-1/2" (4-sided SSG)<br>7-1/2" (Captured)                                                                                                                                                                                                                                                    | 6-1/2" (4-sided SGT)<br>7-1/2" (Captured)                                                                                                                                                                                                                                                                                       | 7-1/2"                                                                                                                                                                                                                    | 6", 7-1/2"                                                                                                                                                                                                                                            |
| Applications                    | Mid-High Rise                                                                                                                                                                                                                                                                                | Mid-High Rise                                                                                                                                                                                                                                                                                                                   | Low to High-Rise                                                                                                                                                                                                          | Low to Mid-Rise                                                                                                                                                                                                                                       |
| Infill Options                  | 1" and 1-3/4"                                                                                                                                                                                                                                                                                | 1" and 1-3/4"                                                                                                                                                                                                                                                                                                                   | 1/4" and 1"                                                                                                                                                                                                               | Up to 1-1/8"                                                                                                                                                                                                                                          |
| Glazing Options                 | Pre-Glazed                                                                                                                                                                                                                                                                                   | Pre-Glazed                                                                                                                                                                                                                                                                                                                      | Pre-Glazed                                                                                                                                                                                                                | Pre-Glazed                                                                                                                                                                                                                                            |
| Thermal                         | Polyamide                                                                                                                                                                                                                                                                                    | Polyamide                                                                                                                                                                                                                                                                                                                       | Silicone Compatible Elastomer                                                                                                                                                                                             | Silicone Compatible Elastomer                                                                                                                                                                                                                         |
| SSG                             | Yes, 4-Sided Structural Silicone Glazing (SSG); 2-Sided Vertical SSG (Captured-Horizontal)                                                                                                                                                                                                   | Yes, 4-Sided Structural Glazing Tape (SGT); 2-Sided Vertical SGT (Captured-Horizontal)                                                                                                                                                                                                                                          | Optional                                                                                                                                                                                                                  | Optional                                                                                                                                                                                                                                              |
| 2 Color Option                  | Yes                                                                                                                                                                                                                                                                                          | Yes                                                                                                                                                                                                                                                                                                                             | Yes                                                                                                                                                                                                                       | Yes                                                                                                                                                                                                                                                   |
| Integrated Entrance Framing     | No                                                                                                                                                                                                                                                                                           | No                                                                                                                                                                                                                                                                                                                              | No                                                                                                                                                                                                                        | Yes                                                                                                                                                                                                                                                   |
| Windows Integration             | No                                                                                                                                                                                                                                                                                           | No                                                                                                                                                                                                                                                                                                                              | Yes                                                                                                                                                                                                                       | Yes                                                                                                                                                                                                                                                   |
| GLASSvent® Integration          | Captured Only                                                                                                                                                                                                                                                                                | Captured Only                                                                                                                                                                                                                                                                                                                   | Yes<br>(with 4 Side Captured)                                                                                                                                                                                             | Yes                                                                                                                                                                                                                                                   |
| Versoleil® Sunshade Integration | No                                                                                                                                                                                                                                                                                           | No                                                                                                                                                                                                                                                                                                                              | No                                                                                                                                                                                                                        | Yes                                                                                                                                                                                                                                                   |
| Fabrication Method              | Screw Spline                                                                                                                                                                                                                                                                                 | Screw Spline                                                                                                                                                                                                                                                                                                                    | Screw Spline                                                                                                                                                                                                              | Screw Spline                                                                                                                                                                                                                                          |
| Product Description             | A high performance pre-glazed unitized curtain wall system with Structural Silicone Glazing (SSG). Shipped in stock length or fabricated or fully glazed and assembled unit.<br><br>Options: Captured or 2-sided Vertical SSG (captured-horizontal) or 4-sided SSG (all glass exterior look) | A high performance pre-glazed unitized curtain wall system with Structural Glazing Tape (SGT), with no curing-wait-time. Shipped in stock length or fabricated to customers for unit assembly and installation.<br><br>Options: Captured or 2-sided Vertical SGT (captured-horizontal) or 4-sided SGT (all glass exterior look) | A high performance unitized curtain wall system. Shipped fabricated for customer unit assembly and installation.<br>The product has (4) types:<br>- 4 Side Captured<br>- 4 Side SSG<br>- Vertical SSG<br>- Horizontal SSG | An outside glazed pressure wall that is designed to be fabricated and assembled in the shop. It is ideal for low to mid-rise curtain wall applications where high performance is desired. Also available in a pre-glazed version - 1600 SS Unitwall®. |
| Testing for Protective Glazing  | —                                                                                                                                                                                                                                                                                            | —                                                                                                                                                                                                                                                                                                                               | Large Missile                                                                                                                                                                                                             | Blast Mitigation                                                                                                                                                                                                                                      |
| Performance Test Standards      | AAMA 501, AAMA 501.1, AAMA 501.4, AAMA 501.5, AAMA 501.6, AAMA 501.7, AAMA 507, AAMA 1503, AAMA 1801, ASTM E90, E283, E330, E331, ASTM E1425, CSA-A440, NFRC 100/200/500, TAS 202                                                                                                            | AAMA 501, 501.1, 501.4, 501.5, AAMA 501.6, 501.7, 507, AAMA 1503, 1801, ASTM E90, E283, E330, E331, ASTM E1425, CSA-A440, NFRC 100/200/500, TAS 202                                                                                                                                                                             | AAMA 501.1, AAMA 507, AAMA 1503, AAMA 1801, ASTM E90, ASTM E283, ASTM E330, ASTM E331, ASTM E1425, ASTM E1886, ASTM E1996, CSA-A440, NFRC 100/200/500                                                                     | AAMA 501.1, AAMA 501.4, AAMA 507, AAMA 1503, AAMA 1801, ASTM E90, ASTM E283, ASTM E330, ASTM E331, ASTM E1425, ASTM F1642, CSA-A440, NFRC 100/200/500, UFC 4-010-01                                                                                   |

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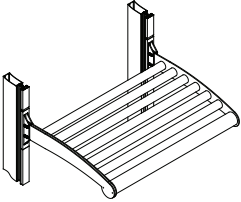
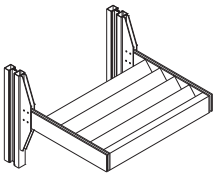
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| Product                         | PG 123® Framing                                                                                                                                                                                                                                                                  | MetroView®<br>FG 501T<br>Window Wall                                                                                                                                                   | MetroView®<br>FG 601T PG<br>Window Wall                                                                                                                                                | FG 623<br>Window Wall                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Catalog Section                 | Curtain Wall - Window Wall                                                                                                                                                                                                                                                       | Curtain Wall - Window Wall                                                                                                                                                             | Curtain Wall - Window Wall                                                                                                                                                             | Curtain Wall - Window Wall                                                                                                                                           |
| Typical Detail                  |                                                                                                                                                                                                 |                                                                                                       |                                                                                                      |                                                                                   |
| Sightline                       | 2-1/4"                                                                                                                                                                                                                                                                           | 2-1/4"                                                                                                                                                                                 | 2-1/4"                                                                                                                                                                                 | 2-1/4"                                                                                                                                                               |
| Depths                          | 6"                                                                                                                                                                                                                                                                               | 5"                                                                                                                                                                                     | 6"                                                                                                                                                                                     | 6"                                                                                                                                                                   |
| Applications                    | Pre-Glazed Exterior Ribbon Windows & Multi-Lite Punched Openings                                                                                                                                                                                                                 | Single or Multi-Lite Punched Openings                                                                                                                                                  | Single or Multi-Lite Punched Openings                                                                                                                                                  | Single or Multi-Lite Punched Openings                                                                                                                                |
| Infill Options                  | 1/4" and 1"                                                                                                                                                                                                                                                                      | 1"                                                                                                                                                                                     | 1" and 1-3/16"                                                                                                                                                                         | 1/4" and 1"                                                                                                                                                          |
| Glazing Options                 | Pre-Glazed or Inside Glazed Units                                                                                                                                                                                                                                                | Inside Glazed or Outside Glazed                                                                                                                                                        | Pre-Glazed                                                                                                                                                                             | Inside Glazed                                                                                                                                                        |
| Thermal                         | IsoWeb® Thermal Barrier and silicone compatible elastomer                                                                                                                                                                                                                        | IsoLock® Lance and Debridge                                                                                                                                                            | IsoLock® Lance and Debridge                                                                                                                                                            | IsoLock® Lance and Debridge                                                                                                                                          |
| SSG                             | Yes                                                                                                                                                                                                                                                                              | No                                                                                                                                                                                     | Yes                                                                                                                                                                                    | No                                                                                                                                                                   |
| 2 Color Option                  | Yes                                                                                                                                                                                                                                                                              | No                                                                                                                                                                                     | Yes                                                                                                                                                                                    | No                                                                                                                                                                   |
| Integrated Entrance Framing     | No                                                                                                                                                                                                                                                                               | Yes                                                                                                                                                                                    | Yes                                                                                                                                                                                    | No                                                                                                                                                                   |
| Windows Integration             | No                                                                                                                                                                                                                                                                               | Yes                                                                                                                                                                                    | Yes                                                                                                                                                                                    | Yes                                                                                                                                                                  |
| GLASSvent® Integration          | No                                                                                                                                                                                                                                                                               | Yes                                                                                                                                                                                    | Yes                                                                                                                                                                                    | No                                                                                                                                                                   |
| Versoleil® Sunshade Integration | No                                                                                                                                                                                                                                                                               | No                                                                                                                                                                                     | No                                                                                                                                                                                     | No                                                                                                                                                                   |
| Fabrication Method              | Screw Spline                                                                                                                                                                                                                                                                     | Screw Spline                                                                                                                                                                           | Screw Spline                                                                                                                                                                           | Shear Block and Screw Spline                                                                                                                                         |
| Product Description             | A pre-assembled and pre-glazed ribbon window and multi-lite punched opening system. An Alcryn rain screen gasket provides the "silicone glazed" appearance without running the exterior silicone weather seal. Optional vertical covers provide a four-side captured appearance. | A 2-1/4" x 5" punched opening window for single or multi-lite openings. It offers a flush metal to exterior appearance, to complement the "glass to the front" look.                   | A 2-1/4" x 6" punched opening window for single or multi-lite openings. It offers a flush metal to exterior appearance, to complement the "glass to the front" look.                   | A 2-1/4" x 6" punched opening window for single or multi-lite openings. It offers a flush metal to exterior appearance, to complement the "glass to the front" look. |
| Testing for Protective Glazing  | —                                                                                                                                                                                                                                                                                | —                                                                                                                                                                                      | —                                                                                                                                                                                      | Small Missile<br>Large Missile                                                                                                                                       |
| Performance Test Standards      | AAMA 501<br>AAMA 507<br>AAMA 1503<br>AAMA 1801<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>NFRC 100/200/500                                                                                                                                                                        | AAMA 507, AAMA 520,<br>AAMA 1503, AAMA 1801,<br>ASTM E90, ASTM E283,<br>ASTM E330, ASTM E331,<br>ASTM E547, ASTM E1425,<br>ASTM E1886, ASTM E1996,<br>NFRC 100/200/400/500,<br>TAS 202 | AAMA 507, AAMA 520,<br>AAMA 1503, AAMA 1801,<br>ASTM E90, ASTM E283,<br>ASTM E330, ASTM E331,<br>ASTM E547, ASTM E1425,<br>ASTM E1886, ASTM E1996,<br>NFRC 100/200/400/500,<br>TAS 202 | AAMA 507<br>AAMA 1503<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>ASTM E1886<br>ASTM E1996<br>NFRC 100/200/500                                                         |

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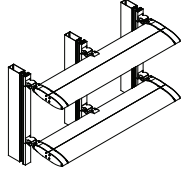
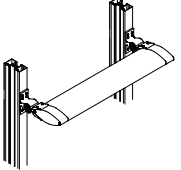
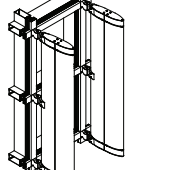
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| Product                                                         | Versoleil® SunShade<br>Outrigger System<br>(Curtain Wall)                                                                                                                                                                                         | Versoleil® SunShade<br>Outrigger System<br>(Storefront)                                                                                                                                                    |  |  |
|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Catalog Section                                                 | Sun Control                                                                                                                                                                                                                                       | Sun Control                                                                                                                                                                                                |  |  |
| Typical<br>Detail                                               |                                                                                                                                                                  |                                                                                                                           |  |  |
| Sightline                                                       | Variable                                                                                                                                                                                                                                          | Variable                                                                                                                                                                                                   |  |  |
| Depths                                                          | 30" and 36" Outrigger Depths                                                                                                                                                                                                                      | 30" Outrigger Depth                                                                                                                                                                                        |  |  |
| Applications                                                    | Low to High-Rise                                                                                                                                                                                                                                  | Storefronts                                                                                                                                                                                                |  |  |
| Infill Options                                                  | —                                                                                                                                                                                                                                                 | —                                                                                                                                                                                                          |  |  |
| Compatible<br>Systems                                           | 1600 Wall System®1<br>1600 Wall System®2<br>1600UT System®1<br>1600 Wall System®5<br>1600 SS<br>1600 SS SSG<br>1630 SS IR                                                                                                                         | Trifab® 451<br>Trifab® 451T<br>Trifab® 451UT<br>Trifab® 601<br>Trifab® 601T<br>Trifab® 601UT<br>IR 501T<br>IR 501UT                                                                                        |  |  |
| Thermally Broken/<br>Thermally Improved                         | Yes (Excluding<br>1600 Wall System®2 and<br>1600 Wall System®5)                                                                                                                                                                                   | Yes<br>(Excluding Trifab® 451 and<br>Trifab® 601)                                                                                                                                                          |  |  |
| Shallow Cover<br>Available                                      | Yes                                                                                                                                                                                                                                               | N/A                                                                                                                                                                                                        |  |  |
| Corners<br>Available                                            | 90° Inside/Outside<br>135° Inside/Outside                                                                                                                                                                                                         | No                                                                                                                                                                                                         |  |  |
| Selector®<br>Sunshading Estimator<br>(Available on kawneer.com) | Yes                                                                                                                                                                                                                                               | Yes                                                                                                                                                                                                        |  |  |
| Fabrication<br>Method                                           | Screw Spline                                                                                                                                                                                                                                      | Screw Spline                                                                                                                                                                                               |  |  |
| Load Charts<br>Available                                        | Yes                                                                                                                                                                                                                                               | Yes                                                                                                                                                                                                        |  |  |
| Blade Options                                                   | Infinity, Flare, Arch, Airfoil,<br>Planar, Wave, Circular,<br>Diamond, Square                                                                                                                                                                     | Infinity, Flare, Arch, Airfoil,<br>Planar, Wave, Circular,<br>Diamond, Square                                                                                                                              |  |  |
| Product<br>Description                                          | Outrigger SunShade system, which seamlessly intergrates with multiple Kawneer curtain wall systems. Highly versatile design offers inside and outside corners, sleek blade options with standard 30" and 36" outriggers for enhanced performance. | Outrigger SunShade system, which seamlessly intergrates with multiple Kawneer storefront systems. Highly versatile design offers sleek blade options with standard 30" outrigger for enhanced performance. |  |  |
| Performance<br>Test Standards                                   | Concentrated load test reports<br>available on request                                                                                                                                                                                            | Concentrated load test reports<br>available on request                                                                                                                                                     |  |  |

Laws and building and safety codes governing the design and use of Kawneer products, such as glazed entrance, window, and curtain wall products, vary widely. Kawneer does not control the selection of product configurations, operating hardware, or glazing materials, and assumes no responsibility therefor.

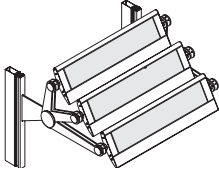
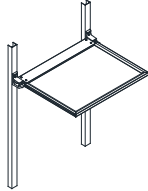
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| Product                                                      | Versoleil® SunShade<br>Single Blade System<br>for Curtain Wall<br>(Horizontal Blade)                                                                                                                                                                                                        | Versoleil® SunShade<br>Single Blade System<br>for Storefront<br>(Horizontal Blade)                                                                                                                                                                                                          | Versoleil® SunShade<br>Single Blade System<br>for Curtain Wall<br>(Vertical Blade)                                                                                                                                                                                                        |  |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Catalog Section                                              | Sun Control                                                                                                                                                                                                                                                                                 | Sun Control                                                                                                                                                                                                                                                                                 | Sun Control                                                                                                                                                                                                                                                                               |  |
| Typical Detail                                               |                                                                                                                                                                                                            |                                                                                                                                                                                                            |                                                                                                                                                                                                         |  |
| Sightline                                                    | Variable                                                                                                                                                                                                                                                                                    | Variable                                                                                                                                                                                                                                                                                    | Variable                                                                                                                                                                                                                                                                                  |  |
| Depths                                                       | Blade Depths of 6", 8", 10", 12" and 14"                                                                                                                                                                                                                                                    | Blade Depths of 6", 8", 10", 12" and 14"                                                                                                                                                                                                                                                    | Blade Depths of 6", 8", 10", 12" and 14"                                                                                                                                                                                                                                                  |  |
| Applications                                                 | Low to High-Rise                                                                                                                                                                                                                                                                            | Storefronts                                                                                                                                                                                                                                                                                 | Low to High-Rise                                                                                                                                                                                                                                                                          |  |
| Infill Options                                               | —                                                                                                                                                                                                                                                                                           | —                                                                                                                                                                                                                                                                                           | —                                                                                                                                                                                                                                                                                         |  |
| Compatible Systems                                           | 1600 Wall System®1<br>1600UT System®1<br>1600 Wall System®2<br>1600 Wall System®5<br>1600 SS<br>1600 SS (SSG)                                                                                                                                                                               | Trifab® 451<br>Trifab® 451T<br>Trifab® 451UT<br>Trifab® 601<br>Trifab® 601T<br>Trifab® 601UT<br>IR501UT                                                                                                                                                                                     | 1600 Wall System®1<br>1600UT System®1<br>1600 Wall System®5<br>1600 SS                                                                                                                                                                                                                    |  |
| Thermally Broken                                             | Yes<br>(Excluding<br>1600 Wall System®5)                                                                                                                                                                                                                                                    | Yes<br>(Excluding Trifab® 451 and<br>Trifab® 601)                                                                                                                                                                                                                                           | Yes<br>(Excluding<br>1600 Wall System®5)                                                                                                                                                                                                                                                  |  |
| Shallow Cover Available                                      | No                                                                                                                                                                                                                                                                                          | N/A                                                                                                                                                                                                                                                                                         | No                                                                                                                                                                                                                                                                                        |  |
| Corners Available                                            | 90° Inside/Outside<br>135° Inside/Outside                                                                                                                                                                                                                                                   | No                                                                                                                                                                                                                                                                                          | N/A                                                                                                                                                                                                                                                                                       |  |
| Solector® Sunshading Estimator<br>(Available on kawneer.com) | Yes                                                                                                                                                                                                                                                                                         | Yes                                                                                                                                                                                                                                                                                         | Yes                                                                                                                                                                                                                                                                                       |  |
| Fabrication Method                                           | Screw Spline                                                                                                                                                                                                                                                                                | Screw Spline                                                                                                                                                                                                                                                                                | Screw Spline                                                                                                                                                                                                                                                                              |  |
| Load Charts Available                                        | Yes                                                                                                                                                                                                                                                                                         | Yes                                                                                                                                                                                                                                                                                         | Yes                                                                                                                                                                                                                                                                                       |  |
| Blade Options                                                | Airfoil Blade<br>6", 8", 10", 12" and 14" Deep                                                                                                                                                                                                                                              | Airfoil Blade<br>6", 8", 10", 12" and 14" Deep                                                                                                                                                                                                                                              | Airfoil Blade<br>6", 8", 10", 12" and 14" Deep                                                                                                                                                                                                                                            |  |
| Product Description                                          | Single blade horizontal sunshade system, which seamlessly integrates with multiple Kawneer curtain wall systems. Highly versatile design allows for blade orientation at multiple angles, and multiple blade widths for maximising shading potential and creating a distinctive appearance. | Single blade horizontal sunshade system, which seamlessly integrates with multiple Kawneer curtain wall systems. Highly versatile design allows for blade orientation at multiple angles, and multiple blade widths for maximising shading potential and creating a distinctive appearance. | Single blade vertical sunshade system, which seamlessly integrates with multiple Kawneer curtain wall systems. Highly versatile design allows for blade orientation at multiple angles and multiple blade widths, for maximising shading potential and creating a distinctive appearance. |  |
| Performance Test Standards                                   | Concentrated load test reports available on request                                                                                                                                                                                                                                         | Concentrated load test reports available on request                                                                                                                                                                                                                                         | Concentrated load test reports available on request                                                                                                                                                                                                                                       |  |

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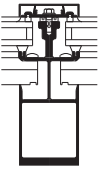
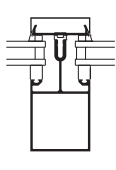
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| Product                                                      | 1600 PowerShade®<br>Sun shade System                                                                                                                         | InLighten®<br>Light Shelf                                                                                                                                                                                                                                                                            |  |  |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Catalog Section                                              | Sun Control                                                                                                                                                  | Sun Control                                                                                                                                                                                                                                                                                          |  |  |
| Typical Detail                                               |                                                                             |                                                                                                                                                                                                                     |  |  |
| Sightline                                                    | Variable                                                                                                                                                     | 1"                                                                                                                                                                                                                                                                                                   |  |  |
| Depths                                                       | Variable depending on configuration                                                                                                                          | Variable (30" Maximum)                                                                                                                                                                                                                                                                               |  |  |
| Applications                                                 | Low to High-Rise                                                                                                                                             | Interior                                                                                                                                                                                                                                                                                             |  |  |
| Infill Options                                               | —                                                                                                                                                            | Reynobond® Aluminum Composite Panel/Translucent Polycarbonate Panel                                                                                                                                                                                                                                  |  |  |
| Compatible Systems                                           | 1600 Wall System®1                                                                                                                                           | Any Kawneer Curtain Wall or Storefront Product* with interior face dimension of 2" and greater                                                                                                                                                                                                       |  |  |
| Thermally Broken                                             | —                                                                                                                                                            | —                                                                                                                                                                                                                                                                                                    |  |  |
| Shallow Cover Available                                      | —                                                                                                                                                            | —                                                                                                                                                                                                                                                                                                    |  |  |
| Corners Available                                            | No                                                                                                                                                           | Yes                                                                                                                                                                                                                                                                                                  |  |  |
| Selector® Sunshading Estimator<br>(Available on kawneer.com) | No                                                                                                                                                           | N/A                                                                                                                                                                                                                                                                                                  |  |  |
| Fabrication Method                                           | Screw Spline                                                                                                                                                 | Screw Spline                                                                                                                                                                                                                                                                                         |  |  |
| Structural Charts Available                                  | —                                                                                                                                                            | N/A                                                                                                                                                                                                                                                                                                  |  |  |
| Blade Options                                                | —                                                                                                                                                            | N/A                                                                                                                                                                                                                                                                                                  |  |  |
| Product Description                                          | A sunshade designed to combine photovoltaic technology with shading to reduce energy usage. 1600 PowerShade® is designed to be used with 1600 Wall System®1. | An interior light shelf designed to passively channel daylight into an occupied space. InLighten® can be applied to multiple Kawneer Curtain Wall or Storefront* products. Unique design allows for easy installation. Tilt feature allows for easy cleaning and care of the top reflective surface. |  |  |
| Performance Test Standards                                   |                                                                                                                                                              |                                                                                                                                                                                                                                                                                                      |  |  |

\* Exclusions apply: Center and Front set only, tubular single piece mullion only.



| Product                     | 1600 Sloped Glazing                                                                                                                                               | 2000 Skylight                                                                                                                                                                                                                                                                                     |  |  |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Catalog Section             | Overhead Glazing                                                                                                                                                  | Overhead Glazing                                                                                                                                                                                                                                                                                  |  |  |
| Typical Detail              |                                                                                  |                                                                                                                                                                                                                  |  |  |
| Sightline                   | 2-1/2"                                                                                                                                                            | 2-1/2"                                                                                                                                                                                                                                                                                            |  |  |
| Depths                      | 4-3/4", 6"                                                                                                                                                        | 5-1/2", 7", 8-1/4"                                                                                                                                                                                                                                                                                |  |  |
| Applications                | Low to High-Rise                                                                                                                                                  | Low to High-Rise                                                                                                                                                                                                                                                                                  |  |  |
| Infill Options              | Up to 1-5/16"                                                                                                                                                     | 1/4" and 1"                                                                                                                                                                                                                                                                                       |  |  |
| Glazing Options             | Outside Glazed                                                                                                                                                    | Outside Glazed                                                                                                                                                                                                                                                                                    |  |  |
| Thermal                     | PVC Isolator                                                                                                                                                      | PVC Isolator                                                                                                                                                                                                                                                                                      |  |  |
| SSG                         | Yes                                                                                                                                                               | Yes                                                                                                                                                                                                                                                                                               |  |  |
| 2 Color Option              | Yes                                                                                                                                                               | Yes                                                                                                                                                                                                                                                                                               |  |  |
| Integrated Entrance Framing | —                                                                                                                                                                 | —                                                                                                                                                                                                                                                                                                 |  |  |
| Windows Integration         | —                                                                                                                                                                 | —                                                                                                                                                                                                                                                                                                 |  |  |
| GLASSvent® Integration      | —                                                                                                                                                                 | —                                                                                                                                                                                                                                                                                                 |  |  |
| Fabrication Method          | Coped/Overlapped/<br>Mechanically Fastened                                                                                                                        | Coped/Overlapped/<br>Mechanically Fastened                                                                                                                                                                                                                                                        |  |  |
| Product Description         | A monumental slope glazing system that easily integrates into the 1600 Wall systems. Has a standard silicone glazed purlin. Fully factory fabricated for quality. | A high performance, low cost slope glazing system engineered to be self-supporting. Available in slope, gables, pyramid, and canopy configurations. The system has optional silicone glazed purlins. It is supplied as a fully-engineered and fabricated package for easier on-site installation. |  |  |
| Performance Test Standards  | AAMA 501.1<br>AAMA 507<br>AAMA 1503<br>ASTM E283<br>ASTM E330<br>ASTM E331<br>NFRC 100/200/500                                                                    | AAMA 507<br>AAMA 1503<br>ASTM E283<br>ASTM E331<br>NFRC 100/200/500                                                                                                                                                                                                                               |  |  |

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To: Joe Weith, White + Burke  
Sandy McGuire, Howard Center

Date: August 9, 2023

Memorandum

Project #: 59011.00

From: Karen Sentoff  
Evan Haugh  
Joe Vanacore

Re: Howard Center Traffic Analysis

VHB has completed a traffic analysis for the proposed expansion of the Howard Center's office and program space at 300 Flynn Avenue in Burlington. This analysis reviews the proposed development program, associated trip generation, and potential impacts at Flynn Avenue and Pine Street. A map of the project area is shown in **Figure 1**. Red arrows indicate driveway locations on Pine Street and Flynn Avenue, which will not be changed as part of this project.

**Figure 1**     **Howard Center**



## Traffic Counts and Adjustments

Base traffic volumes were collected at the Flynn Avenue / Pine Street intersection on Thursday, March 30<sup>th</sup>, 2023. The morning peak hour occurred from 8:00 – 9:00 AM, with 1,392 vehicles total entering the intersection. In the evening, the peak hour was 4:30 – 5:30 PM with 1,683 vehicles total entering the intersection. The count data are shown in **Figure 2**.

**Figure 2 March 2023 Traffic Volumes**

|              |        |    |   |             |     |    |   |     |              |         |
|--------------|--------|----|---|-------------|-----|----|---|-----|--------------|---------|
|              |        |    |   | Pine Street |     |    |   |     |              |         |
|              |        |    |   | 11 peds     |     |    |   |     |              |         |
|              |        |    |   | 101         | 320 | 88 |   |     |              |         |
|              |        |    |   | ↙           | ↓   | ↘  |   |     |              |         |
| Flynn Avenue | 5 peds | 58 | ↗ | AM pk hour  |     |    | ↖ | 234 | Flynn Avenue | 32 peds |
|              |        | 53 | → | 1,392       |     |    | ← | 102 |              |         |
|              |        | 8  | ↘ |             |     |    | ↙ | 6   |              |         |
|              |        |    |   | ↖           | ↑   | ↗  |   |     |              |         |
|              |        |    |   | 21          | 394 | 7  |   |     |              |         |
|              |        |    |   | 5 peds      |     |    |   |     |              |         |
|              |        |    |   | Pine Street |     |    |   |     |              |         |

|              |        |     |   |             |     |     |   |     |              |         |
|--------------|--------|-----|---|-------------|-----|-----|---|-----|--------------|---------|
|              |        |     |   | Pine Street |     |     |   |     |              |         |
|              |        |     |   | 18 peds     |     |     |   |     |              |         |
|              |        |     |   | 104         | 472 | 243 |   |     |              |         |
|              |        |     |   | ↙           | ↓   | ↘   |   |     |              |         |
| Flynn Avenue | 3 peds | 99  | ↗ | PM pk hour  |     |     | ↖ | 168 | Flynn Avenue | 19 peds |
|              |        | 140 | → | 1,683       |     |     | ← | 99  |              |         |
|              |        | 8   | ↘ |             |     |     | ↙ | 10  |              |         |
|              |        |     |   | ↖           | ↑   | ↗   |   |     |              |         |
|              |        |     |   | 28          | 295 | 3   |   |     |              |         |
|              |        |     |   | 5 peds      |     |     |   |     |              |         |
|              |        |     |   | Pine Street |     |     |   |     |              |         |

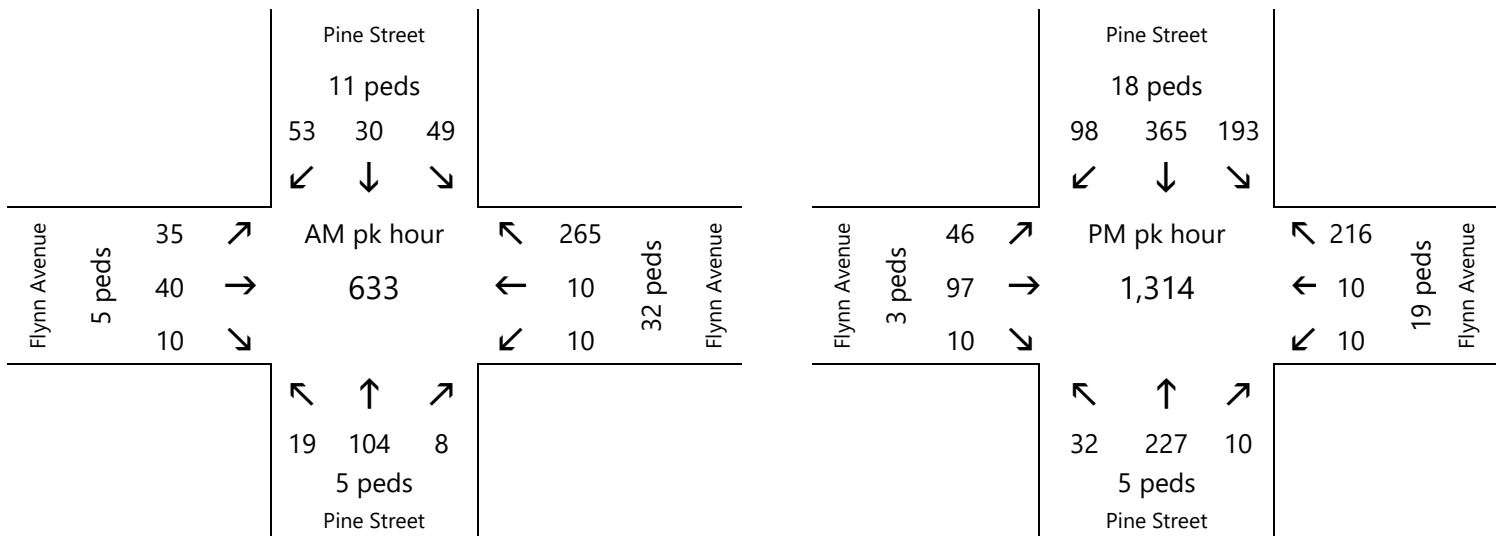
For the purposes of the traffic analysis, the volumes were scaled up to the 2028 Design Hour Volume (DHV). DHV is defined as the 30<sup>th</sup> highest traffic hour of the year. Factors were applied for seasonality and future growth to 2028. For seasonality, 2022 DHV at a nearby continuous counter (D099 on I-189) was compared to the peak hour for the last Thursday of March 2022. Based on this comparison, a ratio of 1.11 was used as the DHV factor for the March 2023 counts. For future growth, the VTrans Red Book lists a 2023 to 2028 growth factor of 1.021<sup>1</sup>.

In addition to the seasonality and growth factors, volumes were also adjusted to account for the opening of the Champlain Parkway. Volumes from the Champlain Parkway plans were used to deduct diverted trips the Parkway captures from Flynn and Pine Street. After scaling to 2028 DHV and subtracting diverted trips, the 2028 No Build Volumes are shown in **Figure 3**.

<sup>1</sup> Vermont Agency of Transportation, June 2023. *Continuous Traffic Counter Report (The Redbook) Based on 2022 Traffic Data*. <https://vtrans.vermont.gov/sites/aot/files/documents/Redbook%202022.pdf>



**Figure 3 2028 No Build Volume**



### Trip Generation

Trip generation estimates for the proposed site were calculated based on rates published in the *ITE Trip Generation Manual, 11<sup>th</sup> Edition*. Land use codes 630 (Medical Clinic) and 710 (General Office Building) were used. Floor space assigned to each Howard Center program was divided between clinical and office uses based on the type of services provided. For the existing use, the building is split approximately 60% clinic and 40% office, or 14,427 ft<sup>2</sup> clinic and 9,618 ft<sup>2</sup> office. The proposed use and programming is expected to be approximately 48% clinic and 52% office, totaling 24,282 ft<sup>2</sup> of clinic space and 25,818 ft<sup>2</sup> of office.

**Table 1** summarizes the trip generation estimate. The net trip generation above current use is anticipated to be 52 AM peak hour trips and 60 PM peak hour trips. Although this area is well-served by transit, pedestrian, and bike facilities, no reduction was made for alternative modes in order to remain conservative.

**Table 1 Trip Generation Summary**

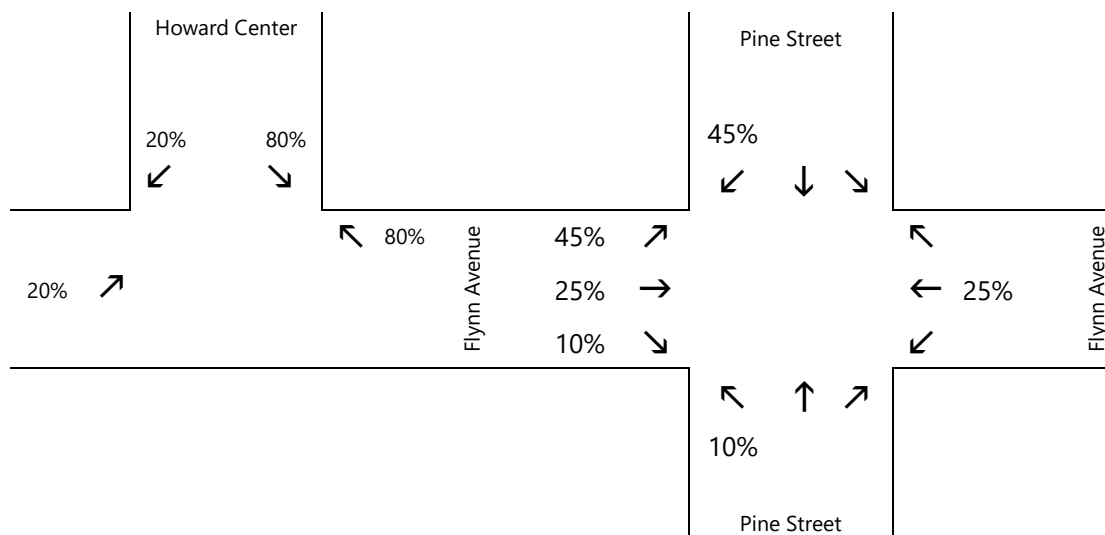
| Site Generated Trips – Howard Center |          |          |         |
|--------------------------------------|----------|----------|---------|
| Peak Period                          | Existing | Proposed | Net New |
| AM Peak Hour                         |          |          |         |
| Enter                                | 45       | 89       | 44      |
| Exit                                 | 9        | 17       | 8       |
| Total                                | 54       | 106      | 52      |
| PM Peak Hour                         |          |          |         |
| Enter                                | 18       | 33       | 15      |
| Exit                                 | 49       | 94       | 45      |
| Total                                | 67       | 127      | 60      |

### Trip Distribution

Trips were distributed based on existing turning movement counts and projected deviation to the Champlain Parkway. To be conservative, all trips were routed through the main driveway on Flynn Avenue so they would navigate the intersection at Flynn Avenue and Pine Street. Trips were distributed according to the following zones, as shown below in **Figure 4**:

- Points South (45%)
  - Via Champlain Parkway – 20%
  - Via Pine Street – 10%
  - Via Flynn to Shelburne Road – 15%
- Points North (55%)
  - Via Pine Street – 45%
  - Via Flynn to Shelburne Road – 10%

**Figure 4 Trip Distribution**



## Traffic Capacity Analysis

An intersection capacity analysis was performed for Flynn Avenue and Pine Street. Levels of service (LOS) were calculated based on the criteria published in the *Highway Capacity Manual (HCM 2000)*<sup>2</sup>. Levels of service range from A to F with LOS A representing generally free flowing operating conditions and LOS F representing generally congested conditions.

### Flynn Avenue and Pine Street

**Table 2** summarizes traffic operations at the signalized intersection of Flynn Avenue and Pine Street during the 2028 weekday AM and PM peak hours under No Build and Build conditions. This intersection consistently operates at an overall LOS B across each scenario.

**Table 2 Signalized Intersection Capacity Analysis**

| Approach                           | 2028 AM No Build |        |       |        | 2028 AM Build |        |       |        |
|------------------------------------|------------------|--------|-------|--------|---------------|--------|-------|--------|
|                                    | v/c              | Delay* | LOS** | Q95*** | v/c           | Delay* | LOS** | Q95*** |
| <b>Flynn Avenue at Pine Street</b> |                  |        |       |        |               |        |       |        |
| Pine Street, SB                    | 0.11             | 7.7    | A     | 26     | 0.11          | 7.8    | A     | 32     |
| Pine Street, NB                    | 0.29             | 13.8   | B     | 81     | 0.32          | 14.2   | B     | 89     |
| Flynn Avenue, EB                   | 0.25             | 14.1   | B     | 57     | 0.28          | 14.1   | B     | 61     |
| Flynn Avenue, WB                   | 0.23             | 13.9   | B     | 61     | 0.25          | 13.9   | B     | 65     |
| Overall Intersection               |                  | 12.5   | B     |        |               | 12.5   | B     |        |

| Approach                           | 2028 PM No Build |        |       |        | 2028 PM Build |        |       |        |
|------------------------------------|------------------|--------|-------|--------|---------------|--------|-------|--------|
|                                    | v/c              | Delay* | LOS** | Q95*** | v/c           | Delay* | LOS** | Q95*** |
| <b>Flynn Avenue at Pine Street</b> |                  |        |       |        |               |        |       |        |
| Pine Street, SB                    | 0.47             | 8.7    | A     | 202    | 0.49          | 9.5    | A     | 229    |
| Pine Street, NB                    | 0.61             | 20.7   | C     | 174    | 0.63          | 22.0   | C     | 189    |
| Flynn Avenue, EB                   | 0.50             | 20.7   | C     | 113    | 0.58          | 22.4   | C     | 137    |
| Flynn Avenue, WB                   | 0.20             | 18.4   | B     | 61     | 0.21          | 18.2   | B     | 62     |
| Overall Intersection               |                  | 14.2   | B     |        |               | 15.3   | B     |        |

\* Delay expressed in seconds per vehicle

\*\* Level of Service

\*\*\* 95<sup>th</sup> percentile queue length expressed in feet. Value shown is maximum of all lanes.

Delay increases of less than 2 seconds on any given approach and overall would be expected with the Build condition compared to the No Build. The additional trips would be expected to have modest effects on queuing. The AM peak

<sup>2</sup> Although HCM 6<sup>th</sup> Edition is the preferred manual, HCM 2000 must be used for intersections with exclusive or leading pedestrian phases.



hour queues would be expected to increase by less than 10 feet. In the PM peak hour, queues would be expected to increase by less than 30 feet, with Pine Street southbound and Flynn Avenue eastbound increasing modestly by 20-30 feet.

## Conclusions

This development is projected to produce 52 net new trips in the AM peak hour and 60 net new trips in the PM peak hour. With conservative assumptions regarding mode split and trip distribution, the new trips are expected to have minimal effect on the intersection of Flynn Avenue and Pine Street. Delay increases by less than two seconds for any given approach or overall may be expected. The additional trips may also have modest effects on queuing, with AM peak queues expected to increase by less than 10 feet and PM peak hour queues expected to increase by less than 30 feet, or one and a half car lengths. An overall Level of Service B is expected to remain in the Build condition for the AM and PM peak hour.

**In conclusion, based on the results of this Traffic Impact Study, the proposed Howard Center expansion is not anticipated to generate unreasonable congestion conditions on the adjacent roadway network.**



# Appendix

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## A: Intersection Capacity Analysis

Queues  
3: Pine St & Flynn Ave

2028 - AM No Build

|                         | →    | ←    | ↑    | ↘    | ↓    |
|-------------------------|------|------|------|------|------|
| Lane Group              | EBT  | WBT  | NBT  | SBL  | SBT  |
| Lane Group Flow (vph)   | 85   | 285  | 131  | 49   | 83   |
| v/c Ratio               | 0.24 | 0.50 | 0.27 | 0.10 | 0.12 |
| Control Delay           | 16.1 | 7.2  | 16.0 | 8.1  | 4.6  |
| Queue Delay             | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 16.1 | 7.2  | 16.0 | 8.1  | 4.6  |
| Queue Length 50th (ft)  | 8    | 2    | 13   | 5    | 3    |
| Queue Length 95th (ft)  | 57   | 61   | 81   | 26   | 26   |
| Internal Link Dist (ft) | 718  | 933  | 707  |      | 1026 |
| Turn Bay Length (ft)    |      |      |      | 150  |      |
| Base Capacity (vph)     | 836  | 1007 | 1128 | 582  | 1541 |
| Starvation Cap Reductn  | 0    | 0    | 0    | 0    | 0    |
| Spillback Cap Reductn   | 0    | 0    | 0    | 0    | 0    |
| Storage Cap Reductn     | 0    | 0    | 0    | 0    | 0    |
| Reduced v/c Ratio       | 0.10 | 0.28 | 0.12 | 0.08 | 0.05 |
| Intersection Summary    |      |      |      |      |      |



# HCM Signalized Intersection Capacity Analysis

2028 - AM No Build

## 3: Pine St & Flynn Ave

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                    |  |                                                                                     |  |  |                                                                                     |
| Traffic Volume (vph)              | 35                                                                                | 40                                                                                | 10                                                                                | 10                                                                                | 10                                                                                | 265                                                                               | 19                                                                                 | 104                                                                                 | 8                                                                                   | 49                                                                                  | 30                                                                                  | 53                                                                                  |
| Future Volume (vph)               | 35                                                                                | 40                                                                                | 10                                                                                | 10                                                                                | 10                                                                                | 265                                                                               | 19                                                                                 | 104                                                                                 | 8                                                                                   | 49                                                                                  | 30                                                                                  | 53                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Lane Width                        | 11                                                                                | 14                                                                                | 11                                                                                | 11                                                                                | 14                                                                                | 11                                                                                | 11                                                                                 | 14                                                                                  | 11                                                                                  | 11                                                                                  | 14                                                                                  | 11                                                                                  |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               |                                                                                   |                                                                                   | 6.0                                                                               |                                                                                   |                                                                                    | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Lane Util. Factor                 |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                    | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Frpb, ped/bikes                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   | 0.92                                                                              |                                                                                   |                                                                                    | 0.99                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Flpb, ped/bikes                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                    | 1.00                                                                                |                                                                                     | 0.97                                                                                | 1.00                                                                                |                                                                                     |
| Frt                               |                                                                                   | 0.98                                                                              |                                                                                   |                                                                                   | 0.87                                                                              |                                                                                   |                                                                                    | 0.99                                                                                |                                                                                     | 1.00                                                                                | 0.90                                                                                |                                                                                     |
| Flt Protected                     |                                                                                   | 0.98                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                    | 0.99                                                                                |                                                                                     | 0.95                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (prot)                 |                                                                                   | 1793                                                                              |                                                                                   |                                                                                   | 1591                                                                              |                                                                                   |                                                                                    | 1964                                                                                |                                                                                     | 1598                                                                                | 1729                                                                                |                                                                                     |
| Flt Permitted                     |                                                                                   | 0.75                                                                              |                                                                                   |                                                                                   | 0.99                                                                              |                                                                                   |                                                                                    | 0.94                                                                                |                                                                                     | 0.57                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (perm)                 |                                                                                   | 1369                                                                              |                                                                                   |                                                                                   | 1571                                                                              |                                                                                   |                                                                                    | 1859                                                                                |                                                                                     | 953                                                                                 | 1729                                                                                |                                                                                     |
| Peak-hour factor, PHF             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Adj. Flow (vph)                   | 35                                                                                | 40                                                                                | 10                                                                                | 10                                                                                | 10                                                                                | 265                                                                               | 19                                                                                 | 104                                                                                 | 8                                                                                   | 49                                                                                  | 30                                                                                  | 53                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 7                                                                                 | 0                                                                                 | 0                                                                                 | 206                                                                               | 0                                                                                 | 0                                                                                  | 3                                                                                   | 0                                                                                   | 0                                                                                   | 30                                                                                  | 0                                                                                   |
| Lane Group Flow (vph)             | 0                                                                                 | 78                                                                                | 0                                                                                 | 0                                                                                 | 79                                                                                | 0                                                                                 | 0                                                                                  | 128                                                                                 | 0                                                                                   | 49                                                                                  | 53                                                                                  | 0                                                                                   |
| Confl. Peds. (#/hr)               |                                                                                   |                                                                                   |                                                                                   | 5                                                                                 |                                                                                   | 36                                                                                |                                                                                    |                                                                                     | 54                                                                                  | 54                                                                                  |                                                                                     |                                                                                     |
| Heavy Vehicles (%)                | 9%                                                                                | 9%                                                                                | 9%                                                                                | 2%                                                                                | 2%                                                                                | 2%                                                                                | 1%                                                                                 | 1%                                                                                  | 1%                                                                                  | 6%                                                                                  | 6%                                                                                  | 6%                                                                                  |
| Turn Type                         | Perm                                                                              | NA                                                                                |                                                                                   | Perm                                                                              | NA                                                                                |                                                                                   | Perm                                                                               | NA                                                                                  |                                                                                     | pm+pt                                                                               | NA                                                                                  |                                                                                     |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                    | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                   | 2                                                                                  |                                                                                     |                                                                                     | 6                                                                                   |                                                                                     |                                                                                     |
| Actuated Green, G (s)             |                                                                                   | 9.6                                                                               |                                                                                   |                                                                                   | 9.6                                                                               |                                                                                   |                                                                                    | 10.1                                                                                |                                                                                     | 18.5                                                                                | 18.5                                                                                |                                                                                     |
| Effective Green, g (s)            |                                                                                   | 9.6                                                                               |                                                                                   |                                                                                   | 9.6                                                                               |                                                                                   |                                                                                    | 10.1                                                                                |                                                                                     | 18.5                                                                                | 18.5                                                                                |                                                                                     |
| Actuated g/C Ratio                |                                                                                   | 0.22                                                                              |                                                                                   |                                                                                   | 0.22                                                                              |                                                                                   |                                                                                    | 0.24                                                                                |                                                                                     | 0.43                                                                                | 0.43                                                                                |                                                                                     |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               |                                                                                   |                                                                                   | 6.0                                                                               |                                                                                   |                                                                                    | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Vehicle Extension (s)             |                                                                                   | 3.0                                                                               |                                                                                   |                                                                                   | 3.0                                                                               |                                                                                   |                                                                                    | 3.0                                                                                 |                                                                                     | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |
| Lane Grp Cap (vph)                |                                                                                   | 307                                                                               |                                                                                   |                                                                                   | 352                                                                               |                                                                                   |                                                                                    | 438                                                                                 |                                                                                     | 448                                                                                 | 747                                                                                 |                                                                                     |
| v/s Ratio Prot                    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     | c0.01                                                                               | 0.03                                                                                |                                                                                     |
| v/s Ratio Perm                    |                                                                                   | c0.06                                                                             |                                                                                   |                                                                                   | 0.05                                                                              |                                                                                   |                                                                                    | c0.07                                                                               |                                                                                     | 0.04                                                                                |                                                                                     |                                                                                     |
| v/c Ratio                         |                                                                                   | 0.25                                                                              |                                                                                   |                                                                                   | 0.23                                                                              |                                                                                   |                                                                                    | 0.29                                                                                |                                                                                     | 0.11                                                                                | 0.07                                                                                |                                                                                     |
| Uniform Delay, d1                 |                                                                                   | 13.7                                                                              |                                                                                   |                                                                                   | 13.6                                                                              |                                                                                   |                                                                                    | 13.4                                                                                |                                                                                     | 7.6                                                                                 | 7.1                                                                                 |                                                                                     |
| Progression Factor                |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                    | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Incremental Delay, d2             |                                                                                   | 0.4                                                                               |                                                                                   |                                                                                   | 0.3                                                                               |                                                                                   |                                                                                    | 0.4                                                                                 |                                                                                     | 0.1                                                                                 | 0.0                                                                                 |                                                                                     |
| Delay (s)                         |                                                                                   | 14.1                                                                              |                                                                                   |                                                                                   | 13.9                                                                              |                                                                                   |                                                                                    | 13.8                                                                                |                                                                                     | 7.7                                                                                 | 7.2                                                                                 |                                                                                     |
| Level of Service                  |                                                                                   | B                                                                                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                    | B                                                                                   |                                                                                     | A                                                                                   | A                                                                                   |                                                                                     |
| Approach Delay (s)                |                                                                                   | 14.1                                                                              |                                                                                   |                                                                                   | 13.9                                                                              |                                                                                   |                                                                                    | 13.8                                                                                |                                                                                     |                                                                                     | 7.3                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | B                                                                                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                    | B                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 12.5                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                    |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.26                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 42.8                                                                              |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                    |                                                                                     | 20.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 44.8%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                    |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

Queues  
3: Pine St & Flynn Ave

2028 - AM Build

|                         | →    | ←    | ↑    | ↘    | ↓    |
|-------------------------|------|------|------|------|------|
| Lane Group              | EBT  | WBT  | NBT  | SBL  | SBT  |
| Lane Group Flow (vph)   | 92   | 295  | 141  | 49   | 110  |
| v/c Ratio               | 0.26 | 0.50 | 0.29 | 0.10 | 0.16 |
| Control Delay           | 16.2 | 7.5  | 16.7 | 8.5  | 4.6  |
| Queue Delay             | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 16.2 | 7.5  | 16.7 | 8.5  | 4.6  |
| Queue Length 50th (ft)  | 9    | 3    | 14   | 5    | 4    |
| Queue Length 95th (ft)  | 61   | 65   | 89   | 27   | 32   |
| Internal Link Dist (ft) | 718  | 933  | 707  |      | 1026 |
| Turn Bay Length (ft)    |      |      |      | 150  |      |
| Base Capacity (vph)     | 814  | 1016 | 1109 | 581  | 1526 |
| Starvation Cap Reductn  | 0    | 0    | 0    | 0    | 0    |
| Spillback Cap Reductn   | 0    | 0    | 0    | 0    | 0    |
| Storage Cap Reductn     | 0    | 0    | 0    | 0    | 0    |
| Reduced v/c Ratio       | 0.11 | 0.29 | 0.13 | 0.08 | 0.07 |
| Intersection Summary    |      |      |      |      |      |

# HCM Signalized Intersection Capacity Analysis

2028 - AM Build

## 3: Pine St & Flynn Ave

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                    |  |                                                                                     |  |  |                                                                                     |
| Traffic Volume (vph)              | 39                                                                                | 42                                                                                | 11                                                                                | 10                                                                                | 21                                                                                | 264                                                                               | 23                                                                                 | 110                                                                                 | 8                                                                                   | 49                                                                                  | 37                                                                                  | 73                                                                                  |
| Future Volume (vph)               | 39                                                                                | 42                                                                                | 11                                                                                | 10                                                                                | 21                                                                                | 264                                                                               | 23                                                                                 | 110                                                                                 | 8                                                                                   | 49                                                                                  | 37                                                                                  | 73                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Lane Width                        | 11                                                                                | 14                                                                                | 11                                                                                | 11                                                                                | 14                                                                                | 11                                                                                | 11                                                                                 | 14                                                                                  | 11                                                                                  | 11                                                                                  | 14                                                                                  | 11                                                                                  |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               |                                                                                   |                                                                                   | 6.0                                                                               |                                                                                   |                                                                                    | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Lane Util. Factor                 |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                    | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Frpb, ped/bikes                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   | 0.92                                                                              |                                                                                   |                                                                                    | 0.99                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Flpb, ped/bikes                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                    | 1.00                                                                                |                                                                                     | 0.97                                                                                | 1.00                                                                                |                                                                                     |
| Frt                               |                                                                                   | 0.98                                                                              |                                                                                   |                                                                                   | 0.88                                                                              |                                                                                   |                                                                                    | 0.99                                                                                |                                                                                     | 1.00                                                                                | 0.90                                                                                |                                                                                     |
| Flt Protected                     |                                                                                   | 0.98                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                    | 0.99                                                                                |                                                                                     | 0.95                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (prot)                 |                                                                                   | 1791                                                                              |                                                                                   |                                                                                   | 1604                                                                              |                                                                                   |                                                                                    | 1964                                                                                |                                                                                     | 1598                                                                                | 1722                                                                                |                                                                                     |
| Flt Permitted                     |                                                                                   | 0.73                                                                              |                                                                                   |                                                                                   | 0.99                                                                              |                                                                                   |                                                                                    | 0.93                                                                                |                                                                                     | 0.57                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (perm)                 |                                                                                   | 1336                                                                              |                                                                                   |                                                                                   | 1585                                                                              |                                                                                   |                                                                                    | 1832                                                                                |                                                                                     | 951                                                                                 | 1722                                                                                |                                                                                     |
| Peak-hour factor, PHF             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Adj. Flow (vph)                   | 39                                                                                | 42                                                                                | 11                                                                                | 10                                                                                | 21                                                                                | 264                                                                               | 23                                                                                 | 110                                                                                 | 8                                                                                   | 49                                                                                  | 37                                                                                  | 73                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 7                                                                                 | 0                                                                                 | 0                                                                                 | 203                                                                               | 0                                                                                 | 0                                                                                  | 3                                                                                   | 0                                                                                   | 0                                                                                   | 42                                                                                  | 0                                                                                   |
| Lane Group Flow (vph)             | 0                                                                                 | 85                                                                                | 0                                                                                 | 0                                                                                 | 92                                                                                | 0                                                                                 | 0                                                                                  | 138                                                                                 | 0                                                                                   | 49                                                                                  | 68                                                                                  | 0                                                                                   |
| Confl. Peds. (#/hr)               |                                                                                   |                                                                                   |                                                                                   | 5                                                                                 |                                                                                   | 36                                                                                |                                                                                    |                                                                                     | 54                                                                                  | 54                                                                                  |                                                                                     |                                                                                     |
| Heavy Vehicles (%)                | 9%                                                                                | 9%                                                                                | 9%                                                                                | 2%                                                                                | 2%                                                                                | 2%                                                                                | 1%                                                                                 | 1%                                                                                  | 1%                                                                                  | 6%                                                                                  | 6%                                                                                  | 6%                                                                                  |
| Turn Type                         | Perm                                                                              | NA                                                                                |                                                                                   | Perm                                                                              | NA                                                                                |                                                                                   | Perm                                                                               | NA                                                                                  |                                                                                     | pm+pt                                                                               | NA                                                                                  |                                                                                     |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                    | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                   | 2                                                                                  |                                                                                     |                                                                                     | 6                                                                                   |                                                                                     |                                                                                     |
| Actuated Green, G (s)             |                                                                                   | 10.0                                                                              |                                                                                   |                                                                                   | 10.0                                                                              |                                                                                   |                                                                                    | 10.1                                                                                |                                                                                     | 18.5                                                                                | 18.5                                                                                |                                                                                     |
| Effective Green, g (s)            |                                                                                   | 10.0                                                                              |                                                                                   |                                                                                   | 10.0                                                                              |                                                                                   |                                                                                    | 10.1                                                                                |                                                                                     | 18.5                                                                                | 18.5                                                                                |                                                                                     |
| Actuated g/C Ratio                |                                                                                   | 0.23                                                                              |                                                                                   |                                                                                   | 0.23                                                                              |                                                                                   |                                                                                    | 0.23                                                                                |                                                                                     | 0.43                                                                                | 0.43                                                                                |                                                                                     |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               |                                                                                   |                                                                                   | 6.0                                                                               |                                                                                   |                                                                                    | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Vehicle Extension (s)             |                                                                                   | 3.0                                                                               |                                                                                   |                                                                                   | 3.0                                                                               |                                                                                   |                                                                                    | 3.0                                                                                 |                                                                                     | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |
| Lane Grp Cap (vph)                |                                                                                   | 309                                                                               |                                                                                   |                                                                                   | 366                                                                               |                                                                                   |                                                                                    | 428                                                                                 |                                                                                     | 443                                                                                 | 737                                                                                 |                                                                                     |
| v/s Ratio Prot                    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 0.01                                                                                | c0.04                                                                               |                                                                                     |
| v/s Ratio Perm                    |                                                                                   | c0.06                                                                             |                                                                                   |                                                                                   | 0.06                                                                              |                                                                                   |                                                                                    | c0.08                                                                               |                                                                                     | 0.04                                                                                |                                                                                     |                                                                                     |
| v/c Ratio                         |                                                                                   | 0.28                                                                              |                                                                                   |                                                                                   | 0.25                                                                              |                                                                                   |                                                                                    | 0.32                                                                                |                                                                                     | 0.11                                                                                | 0.09                                                                                |                                                                                     |
| Uniform Delay, d1                 |                                                                                   | 13.6                                                                              |                                                                                   |                                                                                   | 13.5                                                                              |                                                                                   |                                                                                    | 13.7                                                                                |                                                                                     | 7.7                                                                                 | 7.4                                                                                 |                                                                                     |
| Progression Factor                |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                    | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Incremental Delay, d2             |                                                                                   | 0.5                                                                               |                                                                                   |                                                                                   | 0.4                                                                               |                                                                                   |                                                                                    | 0.4                                                                                 |                                                                                     | 0.1                                                                                 | 0.1                                                                                 |                                                                                     |
| Delay (s)                         |                                                                                   | 14.1                                                                              |                                                                                   |                                                                                   | 13.9                                                                              |                                                                                   |                                                                                    | 14.2                                                                                |                                                                                     | 7.8                                                                                 | 7.4                                                                                 |                                                                                     |
| Level of Service                  |                                                                                   | B                                                                                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                    | B                                                                                   |                                                                                     | A                                                                                   | A                                                                                   |                                                                                     |
| Approach Delay (s)                |                                                                                   | 14.1                                                                              |                                                                                   |                                                                                   | 13.9                                                                              |                                                                                   |                                                                                    | 14.2                                                                                |                                                                                     |                                                                                     | 7.5                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | B                                                                                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                    | B                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   | 12.5                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                   |                                                                                    | B                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   | 0.28                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   | 43.2                                                                              |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                   |                                                                                    | 20.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   | 48.0%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                   |                                                                                    | A                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

08/09/2023

Synchro 11 Report  
Page 2



Queues  
3: Pine St & Flynn Ave

2028 - PM No Build

|                         | →    | ←    | ↑    | ↘    | ↓    |
|-------------------------|------|------|------|------|------|
| Lane Group              | EBT  | WBT  | NBT  | SBL  | SBT  |
| Lane Group Flow (vph)   | 153  | 236  | 269  | 193  | 463  |
| v/c Ratio               | 0.50 | 0.49 | 0.61 | 0.37 | 0.46 |
| Control Delay           | 26.2 | 8.7  | 25.0 | 9.8  | 9.9  |
| Queue Delay             | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 26.2 | 8.7  | 25.0 | 9.8  | 9.9  |
| Queue Length 50th (ft)  | 38   | 5    | 67   | 25   | 65   |
| Queue Length 95th (ft)  | 113  | 61   | 174  | 85   | 202  |
| Internal Link Dist (ft) | 718  | 933  | 707  |      | 1026 |
| Turn Bay Length (ft)    |      |      |      | 150  |      |
| Base Capacity (vph)     | 599  | 734  | 725  | 545  | 1343 |
| Starvation Cap Reductn  | 0    | 0    | 0    | 0    | 0    |
| Spillback Cap Reductn   | 0    | 0    | 0    | 0    | 0    |
| Storage Cap Reductn     | 0    | 0    | 0    | 0    | 0    |
| Reduced v/c Ratio       | 0.26 | 0.32 | 0.37 | 0.35 | 0.34 |
| Intersection Summary    |      |      |      |      |      |

# HCM Signalized Intersection Capacity Analysis

2028 - PM No Build

## 3: Pine St & Flynn Ave

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                    |  |                                                                                     |  |  |                                                                                     |
| Traffic Volume (vph)              | 46                                                                                | 97                                                                                | 10                                                                                | 10                                                                                | 10                                                                                | 216                                                                               | 32                                                                                 | 227                                                                                 | 10                                                                                  | 193                                                                                 | 365                                                                                 | 98                                                                                  |
| Future Volume (vph)               | 46                                                                                | 97                                                                                | 10                                                                                | 10                                                                                | 10                                                                                | 216                                                                               | 32                                                                                 | 227                                                                                 | 10                                                                                  | 193                                                                                 | 365                                                                                 | 98                                                                                  |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                               | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Lane Width                        | 11                                                                                | 14                                                                                | 11                                                                                | 11                                                                                | 14                                                                                | 11                                                                                | 11                                                                                 | 14                                                                                  | 11                                                                                  | 11                                                                                  | 14                                                                                  | 11                                                                                  |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               |                                                                                   |                                                                                   | 6.0                                                                               |                                                                                   |                                                                                    | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Lane Util. Factor                 |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                    | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Frpb, ped/bikes                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   | 0.90                                                                              |                                                                                   |                                                                                    | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Flpb, ped/bikes                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                    | 1.00                                                                                |                                                                                     | 0.98                                                                                | 1.00                                                                                |                                                                                     |
| Frt                               |                                                                                   | 0.99                                                                              |                                                                                   |                                                                                   | 0.88                                                                              |                                                                                   |                                                                                    | 0.99                                                                                |                                                                                     | 1.00                                                                                | 0.97                                                                                |                                                                                     |
| Flt Protected                     |                                                                                   | 0.99                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                    | 0.99                                                                                |                                                                                     | 0.95                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (prot)                 |                                                                                   | 1816                                                                              |                                                                                   |                                                                                   | 1566                                                                              |                                                                                   |                                                                                    | 1976                                                                                |                                                                                     | 1619                                                                                | 1851                                                                                |                                                                                     |
| Flt Permitted                     |                                                                                   | 0.79                                                                              |                                                                                   |                                                                                   | 0.98                                                                              |                                                                                   |                                                                                    | 0.89                                                                                |                                                                                     | 0.40                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (perm)                 |                                                                                   | 1458                                                                              |                                                                                   |                                                                                   | 1539                                                                              |                                                                                   |                                                                                    | 1770                                                                                |                                                                                     | 684                                                                                 | 1851                                                                                |                                                                                     |
| Peak-hour factor, PHF             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                               | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Adj. Flow (vph)                   | 46                                                                                | 97                                                                                | 10                                                                                | 10                                                                                | 10                                                                                | 216                                                                               | 32                                                                                 | 227                                                                                 | 10                                                                                  | 193                                                                                 | 365                                                                                 | 98                                                                                  |
| RTOR Reduction (vph)              | 0                                                                                 | 4                                                                                 | 0                                                                                 | 0                                                                                 | 172                                                                               | 0                                                                                 | 0                                                                                  | 2                                                                                   | 0                                                                                   | 0                                                                                   | 12                                                                                  | 0                                                                                   |
| Lane Group Flow (vph)             | 0                                                                                 | 149                                                                               | 0                                                                                 | 0                                                                                 | 64                                                                                | 0                                                                                 | 0                                                                                  | 267                                                                                 | 0                                                                                   | 193                                                                                 | 451                                                                                 | 0                                                                                   |
| Confl. Peds. (#/hr)               |                                                                                   |                                                                                   |                                                                                   | 5                                                                                 |                                                                                   | 36                                                                                |                                                                                    |                                                                                     | 54                                                                                  | 54                                                                                  |                                                                                     |                                                                                     |
| Heavy Vehicles (%)                | 9%                                                                                | 9%                                                                                | 9%                                                                                | 2%                                                                                | 2%                                                                                | 2%                                                                                | 1%                                                                                 | 1%                                                                                  | 1%                                                                                  | 6%                                                                                  | 6%                                                                                  | 6%                                                                                  |
| Turn Type                         | Perm                                                                              | NA                                                                                |                                                                                   | Perm                                                                              | NA                                                                                |                                                                                   | Perm                                                                               | NA                                                                                  |                                                                                     | pm+pt                                                                               | NA                                                                                  |                                                                                     |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                    | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                   | 2                                                                                  |                                                                                     |                                                                                     | 6                                                                                   |                                                                                     |                                                                                     |
| Actuated Green, G (s)             |                                                                                   | 11.1                                                                              |                                                                                   |                                                                                   | 11.1                                                                              |                                                                                   |                                                                                    | 13.5                                                                                |                                                                                     | 28.6                                                                                | 28.6                                                                                |                                                                                     |
| Effective Green, g (s)            |                                                                                   | 11.1                                                                              |                                                                                   |                                                                                   | 11.1                                                                              |                                                                                   |                                                                                    | 13.5                                                                                |                                                                                     | 28.6                                                                                | 28.6                                                                                |                                                                                     |
| Actuated g/C Ratio                |                                                                                   | 0.20                                                                              |                                                                                   |                                                                                   | 0.20                                                                              |                                                                                   |                                                                                    | 0.25                                                                                |                                                                                     | 0.52                                                                                | 0.52                                                                                |                                                                                     |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               |                                                                                   |                                                                                   | 6.0                                                                               |                                                                                   |                                                                                    | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Vehicle Extension (s)             |                                                                                   | 3.0                                                                               |                                                                                   |                                                                                   | 3.0                                                                               |                                                                                   |                                                                                    | 3.0                                                                                 |                                                                                     | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |
| Lane Grp Cap (vph)                |                                                                                   | 296                                                                               |                                                                                   |                                                                                   | 312                                                                               |                                                                                   |                                                                                    | 437                                                                                 |                                                                                     | 514                                                                                 | 969                                                                                 |                                                                                     |
| v/s Ratio Prot                    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     | 0.06                                                                                | c0.24                                                                               |                                                                                     |
| v/s Ratio Perm                    |                                                                                   | c0.10                                                                             |                                                                                   |                                                                                   | 0.04                                                                              |                                                                                   |                                                                                    | c0.15                                                                               |                                                                                     | 0.13                                                                                |                                                                                     |                                                                                     |
| v/c Ratio                         |                                                                                   | 0.50                                                                              |                                                                                   |                                                                                   | 0.20                                                                              |                                                                                   |                                                                                    | 0.61                                                                                |                                                                                     | 0.38                                                                                | 0.47                                                                                |                                                                                     |
| Uniform Delay, d1                 |                                                                                   | 19.3                                                                              |                                                                                   |                                                                                   | 18.1                                                                              |                                                                                   |                                                                                    | 18.2                                                                                |                                                                                     | 8.2                                                                                 | 8.2                                                                                 |                                                                                     |
| Progression Factor                |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                    | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Incremental Delay, d2             |                                                                                   | 1.3                                                                               |                                                                                   |                                                                                   | 0.3                                                                               |                                                                                   |                                                                                    | 2.5                                                                                 |                                                                                     | 0.5                                                                                 | 0.4                                                                                 |                                                                                     |
| Delay (s)                         |                                                                                   | 20.7                                                                              |                                                                                   |                                                                                   | 18.4                                                                              |                                                                                   |                                                                                    | 20.7                                                                                |                                                                                     | 8.7                                                                                 | 8.5                                                                                 |                                                                                     |
| Level of Service                  |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                    | C                                                                                   |                                                                                     | A                                                                                   | A                                                                                   |                                                                                     |
| Approach Delay (s)                |                                                                                   | 20.7                                                                              |                                                                                   |                                                                                   | 18.4                                                                              |                                                                                   |                                                                                    | 20.7                                                                                |                                                                                     |                                                                                     | 8.6                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                    | C                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   |                                                                                   | 14.2                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                    |                                                                                     |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   |                                                                                   | 0.57                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   |                                                                                   | 54.6                                                                              |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                    |                                                                                     | 20.0                                                                                |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 81.1%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                    |                                                                                     | D                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

Queues  
3: Pine St & Flynn Ave

2028 - PM Build

|                         | →    | ←    | ↑    | ↘    | ↓    |
|-------------------------|------|------|------|------|------|
| Lane Group              | EBT  | WBT  | NBT  | SBL  | SBT  |
| Lane Group Flow (vph)   | 189  | 239  | 272  | 195  | 473  |
| v/c Ratio               | 0.57 | 0.47 | 0.63 | 0.39 | 0.48 |
| Control Delay           | 27.5 | 8.1  | 27.2 | 11.1 | 11.2 |
| Queue Delay             | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  |
| Total Delay             | 27.5 | 8.1  | 27.2 | 11.1 | 11.2 |
| Queue Length 50th (ft)  | 50   | 6    | 74   | 28   | 75   |
| Queue Length 95th (ft)  | 137  | 62   | 189  | 95   | 229  |
| Internal Link Dist (ft) | 718  | 933  | 707  |      | 1026 |
| Turn Bay Length (ft)    |      |      |      | 150  |      |
| Base Capacity (vph)     | 556  | 718  | 690  | 526  | 1290 |
| Starvation Cap Reductn  | 0    | 0    | 0    | 0    | 0    |
| Spillback Cap Reductn   | 0    | 0    | 0    | 0    | 0    |
| Storage Cap Reductn     | 0    | 0    | 0    | 0    | 0    |
| Reduced v/c Ratio       | 0.34 | 0.33 | 0.39 | 0.37 | 0.37 |
| Intersection Summary    |      |      |      |      |      |



# HCM Signalized Intersection Capacity Analysis

## 3: Pine St & Flynn Ave

2028 - PM Build

|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                     |  |                                                                                     |  |  |                                                                                     |
| Traffic Volume (vph)              | 66                                                                                | 108                                                                               | 15                                                                                | 10                                                                                | 14                                                                                | 215                                                                               | 34                                                                                  | 228                                                                                 | 10                                                                                  | 195                                                                                 | 368                                                                                 | 105                                                                                 |
| Future Volume (vph)               | 66                                                                                | 108                                                                               | 15                                                                                | 10                                                                                | 14                                                                                | 215                                                                               | 34                                                                                  | 228                                                                                 | 10                                                                                  | 195                                                                                 | 368                                                                                 | 105                                                                                 |
| Ideal Flow (vphpl)                | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                              | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                | 1900                                                                                |
| Lane Width                        | 11                                                                                | 14                                                                                | 11                                                                                | 11                                                                                | 14                                                                                | 11                                                                                | 11                                                                                  | 14                                                                                  | 11                                                                                  | 11                                                                                  | 14                                                                                  | 11                                                                                  |
| Total Lost time (s)               |                                                                                   | 6.0                                                                               |                                                                                   |                                                                                   | 6.0                                                                               |                                                                                   |                                                                                     | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Lane Util. Factor                 |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                     | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Frpb, ped/bikes                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   | 0.90                                                                              |                                                                                   |                                                                                     | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Flpb, ped/bikes                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                     | 1.00                                                                                |                                                                                     | 0.98                                                                                | 1.00                                                                                |                                                                                     |
| Frt                               |                                                                                   | 0.99                                                                              |                                                                                   |                                                                                   | 0.88                                                                              |                                                                                   |                                                                                     | 1.00                                                                                |                                                                                     | 1.00                                                                                | 0.97                                                                                |                                                                                     |
| Flt Protected                     |                                                                                   | 0.98                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                     | 0.99                                                                                |                                                                                     | 0.95                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (prot)                 |                                                                                   | 1808                                                                              |                                                                                   |                                                                                   | 1567                                                                              |                                                                                   |                                                                                     | 1975                                                                                |                                                                                     | 1619                                                                                | 1848                                                                                |                                                                                     |
| Flt Permitted                     |                                                                                   | 0.76                                                                              |                                                                                   |                                                                                   | 0.98                                                                              |                                                                                   |                                                                                     | 0.88                                                                                |                                                                                     | 0.39                                                                                | 1.00                                                                                |                                                                                     |
| Satd. Flow (perm)                 |                                                                                   | 1405                                                                              |                                                                                   |                                                                                   | 1540                                                                              |                                                                                   |                                                                                     | 1755                                                                                |                                                                                     | 673                                                                                 | 1848                                                                                |                                                                                     |
| Peak-hour factor, PHF             | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                              | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                | 1.00                                                                                |
| Adj. Flow (vph)                   | 66                                                                                | 108                                                                               | 15                                                                                | 10                                                                                | 14                                                                                | 215                                                                               | 34                                                                                  | 228                                                                                 | 10                                                                                  | 195                                                                                 | 368                                                                                 | 105                                                                                 |
| RTOR Reduction (vph)              | 0                                                                                 | 5                                                                                 | 0                                                                                 | 0                                                                                 | 166                                                                               | 0                                                                                 | 0                                                                                   | 2                                                                                   | 0                                                                                   | 0                                                                                   | 13                                                                                  | 0                                                                                   |
| Lane Group Flow (vph)             | 0                                                                                 | 184                                                                               | 0                                                                                 | 0                                                                                 | 73                                                                                | 0                                                                                 | 0                                                                                   | 270                                                                                 | 0                                                                                   | 195                                                                                 | 460                                                                                 | 0                                                                                   |
| Confl. Peds. (#/hr)               |                                                                                   |                                                                                   |                                                                                   | 5                                                                                 |                                                                                   | 36                                                                                |                                                                                     |                                                                                     | 54                                                                                  | 54                                                                                  |                                                                                     |                                                                                     |
| Heavy Vehicles (%)                | 9%                                                                                | 9%                                                                                | 9%                                                                                | 2%                                                                                | 2%                                                                                | 2%                                                                                | 1%                                                                                  | 1%                                                                                  | 1%                                                                                  | 6%                                                                                  | 6%                                                                                  | 6%                                                                                  |
| Turn Type                         | Perm                                                                              | NA                                                                                |                                                                                   | Perm                                                                              | NA                                                                                |                                                                                   | Perm                                                                                | NA                                                                                  |                                                                                     | pm+pt                                                                               | NA                                                                                  |                                                                                     |
| Protected Phases                  |                                                                                   | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                     | 2                                                                                   |                                                                                     | 1                                                                                   | 6                                                                                   |                                                                                     |
| Permitted Phases                  | 4                                                                                 |                                                                                   |                                                                                   | 8                                                                                 |                                                                                   |                                                                                   | 2                                                                                   |                                                                                     |                                                                                     | 6                                                                                   |                                                                                     |                                                                                     |
| Actuated Green, G (s)             |                                                                                   | 12.9                                                                              |                                                                                   |                                                                                   | 12.9                                                                              |                                                                                   |                                                                                     | 14.0                                                                                |                                                                                     | 29.2                                                                                | 29.2                                                                                |                                                                                     |
| Effective Green, g (s)            |                                                                                   | 12.9                                                                              |                                                                                   |                                                                                   | 12.9                                                                              |                                                                                   |                                                                                     | 14.0                                                                                |                                                                                     | 29.2                                                                                | 29.2                                                                                |                                                                                     |
| Actuated g/C Ratio                |                                                                                   | 0.23                                                                              |                                                                                   |                                                                                   | 0.23                                                                              |                                                                                   |                                                                                     | 0.25                                                                                |                                                                                     | 0.51                                                                                | 0.51                                                                                |                                                                                     |
| Clearance Time (s)                |                                                                                   | 6.0                                                                               |                                                                                   |                                                                                   | 6.0                                                                               |                                                                                   |                                                                                     | 6.0                                                                                 |                                                                                     | 6.0                                                                                 | 6.0                                                                                 |                                                                                     |
| Vehicle Extension (s)             |                                                                                   | 3.0                                                                               |                                                                                   |                                                                                   | 3.0                                                                               |                                                                                   |                                                                                     | 3.0                                                                                 |                                                                                     | 3.0                                                                                 | 3.0                                                                                 |                                                                                     |
| Lane Grp Cap (vph)                |                                                                                   | 317                                                                               |                                                                                   |                                                                                   | 348                                                                               |                                                                                   |                                                                                     | 431                                                                                 |                                                                                     | 497                                                                                 | 946                                                                                 |                                                                                     |
| v/s Ratio Prot                    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     | 0.06                                                                                | c0.25                                                                               |                                                                                     |
| v/s Ratio Perm                    |                                                                                   | c0.13                                                                             |                                                                                   |                                                                                   | 0.05                                                                              |                                                                                   |                                                                                     | c0.15                                                                               |                                                                                     | 0.14                                                                                |                                                                                     |                                                                                     |
| v/c Ratio                         |                                                                                   | 0.58                                                                              |                                                                                   |                                                                                   | 0.21                                                                              |                                                                                   |                                                                                     | 0.63                                                                                |                                                                                     | 0.39                                                                                | 0.49                                                                                |                                                                                     |
| Uniform Delay, d1                 |                                                                                   | 19.6                                                                              |                                                                                   |                                                                                   | 17.9                                                                              |                                                                                   |                                                                                     | 19.2                                                                                |                                                                                     | 9.0                                                                                 | 9.0                                                                                 |                                                                                     |
| Progression Factor                |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                   | 1.00                                                                              |                                                                                   |                                                                                     | 1.00                                                                                |                                                                                     | 1.00                                                                                | 1.00                                                                                |                                                                                     |
| Incremental Delay, d2             |                                                                                   | 2.7                                                                               |                                                                                   |                                                                                   | 0.3                                                                               |                                                                                   |                                                                                     | 2.9                                                                                 |                                                                                     | 0.5                                                                                 | 0.4                                                                                 |                                                                                     |
| Delay (s)                         |                                                                                   | 22.4                                                                              |                                                                                   |                                                                                   | 18.2                                                                              |                                                                                   |                                                                                     | 22.0                                                                                |                                                                                     | 9.5                                                                                 | 9.4                                                                                 |                                                                                     |
| Level of Service                  |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                     | C                                                                                   |                                                                                     | A                                                                                   | A                                                                                   |                                                                                     |
| Approach Delay (s)                |                                                                                   | 22.4                                                                              |                                                                                   |                                                                                   | 18.2                                                                              |                                                                                   |                                                                                     | 22.0                                                                                |                                                                                     |                                                                                     | 9.4                                                                                 |                                                                                     |
| Approach LOS                      |                                                                                   | C                                                                                 |                                                                                   |                                                                                   | B                                                                                 |                                                                                   |                                                                                     | C                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |
| <b>Intersection Summary</b>       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Control Delay            |                                                                                   | 15.3                                                                              |                                                                                   |                                                                                   | HCM 2000 Level of Service                                                         |                                                                                   |                                                                                     | B                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| HCM 2000 Volume to Capacity ratio |                                                                                   | 0.61                                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Actuated Cycle Length (s)         |                                                                                   | 57.0                                                                              |                                                                                   |                                                                                   | Sum of lost time (s)                                                              |                                                                                   |                                                                                     | 20.0                                                                                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   | 88.0%                                                                             |                                                                                   |                                                                                   | ICU Level of Service                                                              |                                                                                   |                                                                                     | E                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| c Critical Lane Group             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

08/09/2023

Synchro 11 Report  
Page 2

# *Modern Aluminum* COLLECTION



Crisp lines and sleek design formed from durable corrosion-resistant aluminum and light-filtering glass.

**The Genuine. The Original.**







*The Modern Aluminum Collection doors present contemporary elegance with sleek lines while delivering maximum light infiltration into the garage space.*



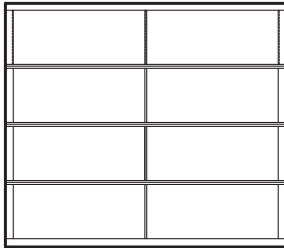


# Modern Aluminum COLLECTION

## Door Designs

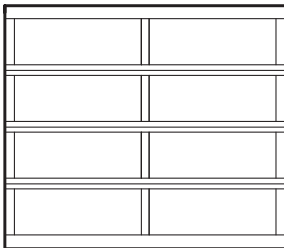
Select your Door Panel Style and Glass

### 1 Choose a Frame Option



#### Model 9910 (511)\* Standard Frame

- Narrow rails and stiles
- An array of frame finishes and special custom options
- Door sizes **up to 16' 2" wide by 16' 1" high**



#### Model 9920 (521)\* Heavy-duty Frame

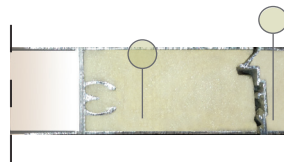
- Wide, heavy-duty rails and stiles
- An array of frame finishes and special custom options
- Door sizes **up to 26' 2" wide by 20' 1" high**
- Joint seal between sections for additional weather-resistance
- **Wind load and impact rated door** Door can be built to withstand a variety of wind conditions
- Optional **polyurethane** insulation for rails and stiles up to 18'2" wide

\* Section height varies dependent on door height.

† R-Value: Overhead Door Corporation uses a calculated door section R-Value for our insulated doors.

#### R-values† of complete Model 9920 with insulated rails and stiles

| 1/2" Insulated Glazing Unit   | Door R-Value) |
|-------------------------------|---------------|
| DSB- Clear, Tempered, Obscure | 2.87          |
| Clear Polycarbonate           | 2.93          |
| DSB - Solar Bronze            | 3.17          |
| DSB - Low E coating           | 3.43          |
| SolarBan 70XL Argon Filled    | 4.09          |
| Multi-wall Polycarbonate      | Door R-Value  |
| 1/4" Thick Unit               | 2.75          |
| 3/8" Thick Unit               | 3.21          |
| 5/8" Thick Unit               | 3.48          |
| Insulated Panels              | Door R-Value  |
| 3/8" EPS solid panels         | 2.60          |



Polyurethane filled rails and stiles

Note: Previous model numbers and panel styles are noted in parentheses in gray.

### 2 Choose a Glass Type

#### Specialty Glass

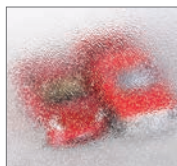
- Laminated White – privacy
- Low E Glass\*\* – thermal efficiency
- Tempered Glass – enhanced safety
- Tinted Glass\*\* – color options: Green, Gray, Bronze

#### Glass Alternatives

- Clear Lexan® Polycarbonate\*\* – shatter resistant
- Multi Wall Polycarbonate – superior strength with UV protection; color options: Clear, White, Bronze
- Plexiglas® Acrylic\*\* – shatter resistant
- Impact Clear and Frosted Polycarbonate - 0.250" minimum



Double Strength DSB\*\* (Standard)



Obscure



Satin Etched



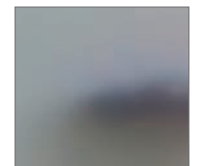
Gray Tint



Green Tint

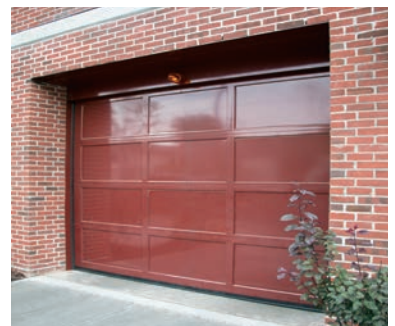


Bronze Tint



Impact Frosted Polycarbonate

Solid aluminum panels also available.



Actual glass may vary from brochure photos due to fluctuations in the printing process. Check with your Overhead Door™ Distributor to view a glass sample.

\*\* Insulated options available.

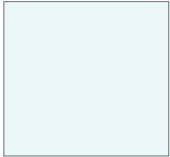
# Modern Aluminum COLLECTION

## Decorative Accents

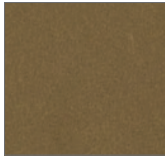
Customize your Door with Color

### 3 Choose a Color

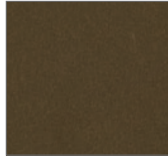
#### Anodized Finishes



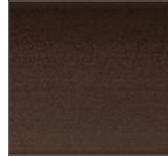
Clear (standard)



Light Bronze



Medium Bronze

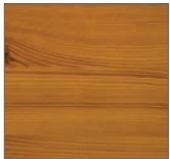


Dark Bronze



Black

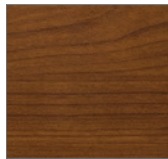
#### Wood Grain Powder Coat Finishes (Model 9920 only)



Knotty Pine



Cherry



Cherry with Flame



Dark Walnut

Actual color may vary slightly from brochure due to fluctuations in printing process. Color samples are available by request through your local Overhead Door™ Distributor.

#### RAL Powder Coat Finishes

Select from approximately 200 RAL powder coat color options to best match your home.



### 4 Choose Your Opener



Be sure to ask about our complete line of Overhead Door® garage door openers. Powerful, quiet and durable, these garage door openers are designed for performance, safety and convenience. Your Overhead Door™ Distributor will help you choose the opener that best suits your door and preferences.



Model 9920 (521), Clear anodized finish, Double Strength glass



# Built Better from the Inside Out

## Door Construction

*The Modern Aluminum Collection Models 9910 and 9920 combine glass and aluminum for unparalleled visual appeal, strength and light infiltration. A unique solution for your extraordinary home.*



### Between Section Seals

Offer additional weather-resistance.



### Commercial-grade Aluminum Frame

Low-maintenance and corrosion resistant.

### Design Flexibility

Available in a variety of vertical rail and horizontal stile widths to complement the style of your home.

### Finished Hardware

Hinges and fixtures are galvanized to maintain a contemporary look.

### Integrated Stiffening Struts\*

Strong, light-weight struts are included in the design of the rail assembly to enhance durability.

\* Offered on non-wind loaded doors only. Size restrictions may apply. See your Overhead Door™ Distributor for details.

### Wind Load-rated Doors

Model 9920 can be built to meet local building codes and provide your home with protection from a variety of wind conditions, such as hurricane force winds. We have Florida Building Code Static and Impact approvals on our best-selling Modern Aluminum Model 9920. These doors feature unobstructed views with no reinforcement struts running across the sections. Tough polycarbonate glazing is also available in clear for commercial needs or frosted for residential applications.

### Energy Efficiency

Thermal performance test ratings are available for Model 9920, including air infiltration, U-Factor, solar heat gain coefficient (SHGC), visible transmittance (VT), condensation resistance and sound transmission class (STC).

Model 9920 meets IECC® requirements for air infiltration.





## Transform Your Home with the DoorView® Visualization Tool.

Go to [overheaddoor.com](https://overheaddoor.com) to try our online interactive software tool that lets you visualize what your home would look like with a new Overhead Door™ garage door. Contact your local Overhead Door™ Distributor for more information and to receive a quote.



### The Genuine. The Original.

Since 1921, Overhead Door Corporation has not only raised the standards of excellence for the industry – we’ve created them. We created the first sectional garage door in 1921 and the first electric garage door opener in 1926.

Today, our network of over 400 Overhead Door™ Distributors are still leading the way with innovative solutions and unmatched installation, service and support. So look for the Red Ribbon. It’s your guarantee that you’re getting the genuine, the original Overhead Door™ products and services.

SOLD AND DISTRIBUTED BY:



### The Genuine. The Original.



2501 S. State Hwy. 121 Bus., Suite 200, Lewisville, TX 75067  
1-800-929-DOOR • [sales@overheaddoor.com](mailto:sales@overheaddoor.com)  
[overheaddoor.com](https://overheaddoor.com)

## Howard Center Redevelopment Project, 300 Flynn Ave. & 855 Pine St. **Stormwater General Permit 3-9050 Narrative**

### **1. Introduction**

Engineering Ventures, PC are writing on behalf of Howard Center to apply for a State Stormwater Discharge Permit pursuant to General Permit 3-9050. This project requires a permit as it includes the redevelopment of impervious surfaces greater than one-half acre.

### **2. Project Description**

The proposed project consists of the demolition of an existing office building and the construction of a new, larger one on some of the same footprint. Two existing parking lots will be reconstructed and a covered parking garage added. The purpose of this project is to create a centralized location for Howard Center's social services. Site balancing is proposed so that some of the redeveloped area will be treated as new to meet the requisite standards.

### **3. Existing Condition**

This project is located in the south end of Burlington, Vermont at the junction of Pine Street and Flynn Avenue. The southern portion of the existing site is developed with the above-mentioned building and parking lots. The northern portion of the site slopes steeply down to a class II wetland which surrounds Engelsby Brook. This undeveloped area is mapped as Munson and Belgrade silt loams, 12 to 25 percent slopes, and described as hydrologic soil group C/D. The developed part of the site has no available digital data on the USDA soil survey. Test pits, borings, and infiltration tests were conducted by John Turner Consulting (see attached report). The testing concluded that the soils in the developed area consist of silty sand with some gravel to approximately ten feet below grade and are underlain by lean clay or bedrock. Infiltration tests concluded no capacity in the majority of the project area, with the exception of IT-1 which provided a rate of ~10 in/hr.

The southern half of the Flynn Avenue parking lot flows towards the street and enters the city of Burlington conveyance system which discharges to Engelsby Brook just west of the project parcel (SN03). The eastern half of the Pine Street parking area flows towards the street and enters the city's conveyance system. This area discharges to a detention pond south of Electric Avenue which overflows to Lake Champlain (SN02). The remainder of the site, including the building's roof, via overland flow or closed pipe, discharges directly into the wetland (SN01). The contributing area to Engelsby Brook is considered a stormwater impaired watershed and is subject to a flow restoration plan which was published in 2017. The project area was noted as a potential location for a proposed dry detention basin as part of the plan.

| Existing Land Use (Acres)                        |       |       |       |       |       |
|--------------------------------------------------|-------|-------|-------|-------|-------|
|                                                  | A     | B     | C     | D     | Total |
| Grass                                            | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Meadow                                           | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Woods                                            | 0.000 | 0.000 | 0.000 | 0.620 | 0.620 |
| Existing Impervious                              | 0.000 | 0.000 | 0.000 | 0.719 | 0.719 |
| Impervious previously authorized under 2002 VSMM |       |       |       |       | 0.000 |
| Total Pre Site Area                              |       |       |       |       | 1.339 |

#### 4. Proposed Stormwater System:

This project proposes dense development on the exiting disturbed area with as little impact to the natural area (i.e. wetland buffer) as practicable. The runoff from the parking lots and building roof are proposed to be treated in high-rate filters (Focal Point system) before discharging into below-grade detention/infiltration tanks. The tanks are sized to detain the channel protection volume and have a controlled outlet to mitigate the ten-year storm. A conservative infiltration rate of 0.2 inches/hour was used in the design as the bedrock profile under the proposed system is not fully known.

The water quality treatment standard is calculated based on the entire site, however, not all areas of the site are routed to treatment. Smaller portions of the parking lots will continue to discharge to SN02 (0.04 acres post versus 0.05 acres pre) and SN03 (0.06 acres post versus 0.25 acres pre). Downgrade areas of lawn and wetland buffer (0.23 acres) will also bypass the treatment system but discharge to the same receiving body (SN01).

| Proposed Land Use (Acres)                        |       |       |       |       |       |
|--------------------------------------------------|-------|-------|-------|-------|-------|
|                                                  | A     | B     | C     | D     | Total |
| Grass                                            | 0.000 | 0.000 | 0.000 | 0.132 | 0.132 |
| Meadow                                           | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Woods                                            | 0.000 | 0.000 | 0.000 | 0.196 | 0.196 |
| New Impervious                                   | 0.000 | 0.000 | 0.000 | 0.371 | 0.371 |
| Existing to Treat                                | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Existing Impervious Not for Permit Coverage      |       |       |       |       | 0.000 |
| Redeveloped Impervious                           |       |       |       |       | 0.640 |
| Impervious previously authorized under 2002 VSMM |       |       |       |       | 0.000 |
| Total Site Area                                  |       |       |       |       | 1.339 |

$$WQ_{VT} = \frac{P * R_V * A}{12 \frac{in}{ft}} \rightarrow WQ_{VT} = 0.0602 \text{ acre} - \text{feet} \quad \text{Equation 2 - 2}$$

where:

$WQ_{VT}$  = total water quality treatment volume required (acre – feet)

$P$  = 1 inch across Vermont

$R_V$  = volumetric runoff coefficient  $\rightarrow R_V = 0.05 + 0.009I \rightarrow R_V = 0.730$

$I$  = site imperviousness  $\rightarrow I_N = \frac{0.371 \text{ ac}}{1.339 \text{ ac}} * 100\% \rightarrow I = 27.7\%$   $I_R = \frac{0.641 \text{ ac}}{1.339 \text{ ac}} * 100\% \rightarrow I = 47.9\%$

$A$  = site area (acres)  $\rightarrow A = 1.339 \text{ acres}$



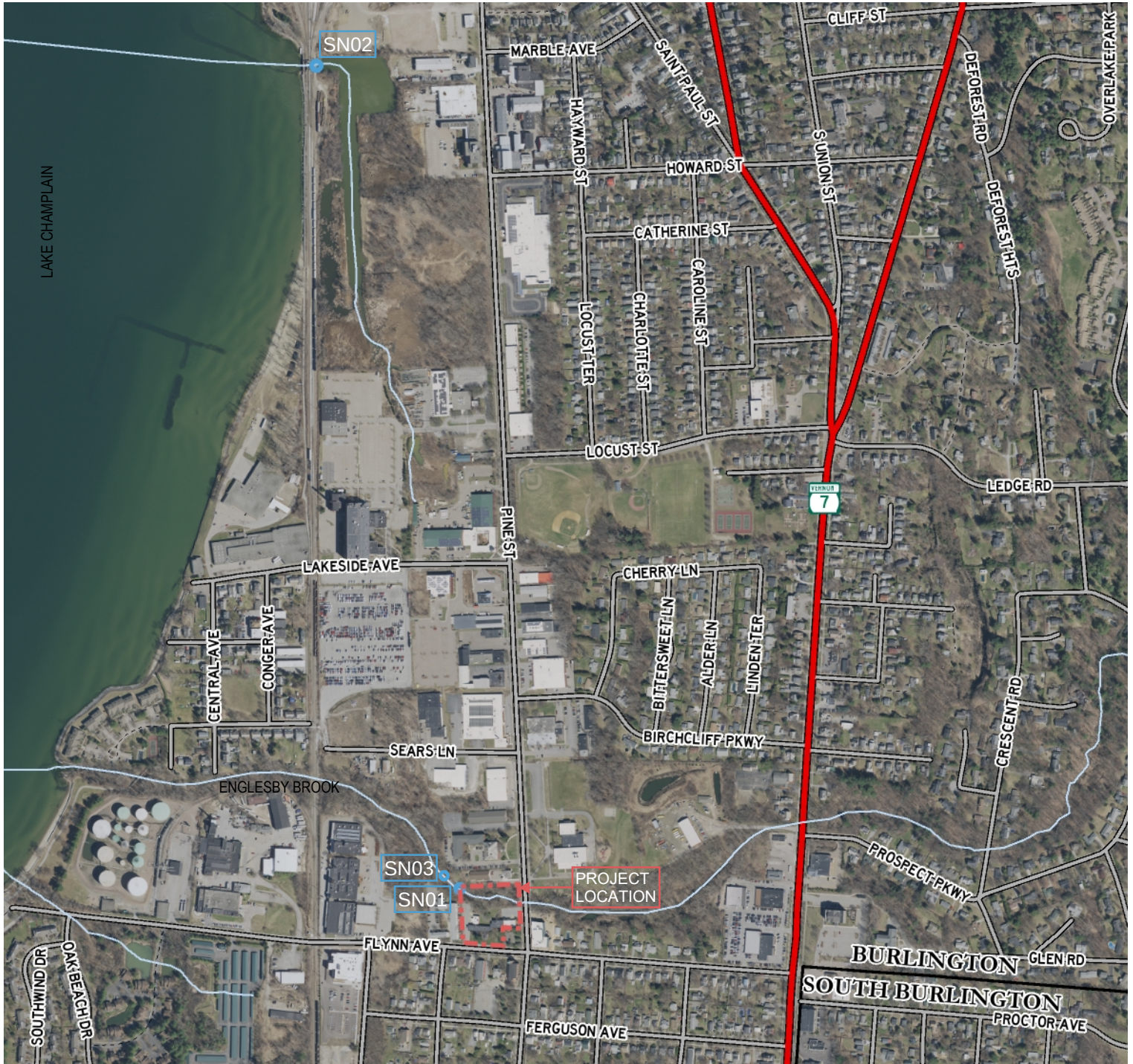
- a) Description of Impervious Area: 0.952 acres including rooftop, asphalt and concrete pavement

| Proposed Treated Land Use (Acres) |       |       |       |       |       |
|-----------------------------------|-------|-------|-------|-------|-------|
|                                   | A     | B     | C     | D     | Total |
| Grass                             | 0.000 | 0.000 | 0.000 | 0.029 | 0.029 |
| Meadow                            | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Woods                             | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| New Impervious                    | 0.000 | 0.000 | 0.000 | 0.331 | 0.331 |
| Existing to Treat                 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Redeveloped Impervious            |       |       |       |       | 0.621 |
| Total Site Area                   |       |       |       |       | 0.981 |

- b) Receiving Body: SN01 - Unnamed wetland tributary to Engelsby Brook
- c) Fish Habitat Designation for Receiving Water: Warm
- d) Description of compliance with each of the treatment standards in the 2017 VSMM including the treatment practices or waivers used to meet each of the following standards:
- i) The Post-Construction Soil Depth and Quality Standard: Met by any of the four methods cited in the 2017 VSMM (all four are listed on the plans with final decision left to the contractor)
  - ii) The Groundwater Recharge Standard: Waived due to HSG D soils
  - iii) The Water Quality Treatment Standard: SN01 - Met via high-rate filters (Focal Point system, tier 2)
  - iv) Channel Protection Standard: SN01 - Met via detention/infiltration chambers
  - v) Overbank Flood Protection Standard: SN01 - Met via detention/infiltration chambers
  - vi) Extreme Flood Protection Standard ( $Q_{P100}$ ): A waiver is sought as proposed impervious is less than 10-acres

The following items are included for review:

- Location Map
- Soil Map
- Geotechnical Report by J. Turner Consulting, Inc.
- Select Pages from Engelsby Brook Flow Restoration Plan



## LEGEND

## NOTES

Map created using ANR's  
Natural Resources Atlas

1: 10,000

July 11, 2023



1,667.0 0 834.00 1,667.0 Feet

WGS\_1984\_Web\_Mercator\_Auxiliary\_Sphere  
© Vermont Agency of Natural Resources

1" = 833 Ft. 1cm = 100 Meters  
THIS MAP IS NOT TO BE USED FOR NAVIGATION

**DISCLAIMER:** This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.



# Soil Map - Howard Center Redevelopment Project



| Map unit symbol             | Map unit name                                           | Rating | Acres in AOI | Percent of AOI |
|-----------------------------|---------------------------------------------------------|--------|--------------|----------------|
| MuD                         | Munson and Belgrade silt loams, 12 to 25 percent slopes | C/D    | 1.1          | 47.8%          |
| NOTCOM                      | No Digital Data Available                               |        | 1.2          | 52.2%          |
| Totals for Area of Interest |                                                         |        | 2.3          | 100.0%         |





## GEOTECHNICAL INVESTIGATION REPORT

### HOWARD CENTER REDEVELOPMENT PROJECT

300 Flynn Avenue  
Burlington, VT 05401

Prepared for:

Howard Center  
Burlington, VT 05401

Prepared by:

John Turner Consulting, Inc.  
12 Gregory Drive, Unit 7  
South Burlington, VT 05403

**JTC Project No. 22-04-138**

February 7, 2023



Quentyn Guglielmo  
Senior Staff Engineer  
[gguglielmo@consultjtc.com](mailto:gguglielmo@consultjtc.com)  
Ph: (831) 578-6620



Stephen C. Lanne, P.E.  
Vice President of Engineering  
[slanne@consultjtc.com](mailto:slanne@consultjtc.com)  
Ph: (413) 222-1675

February 7, 2023

Sandy McGuire - CFO  
Howard Center  
208 Flynn Avenue, Suite 3J  
Burlington, VT 05401  
P: 802-488-6900  
E: sandym@howardcenter.org

**RE: Geotechnical Investigation Report  
Howard Center Redevelopment Project  
300 Flynn Avenue  
Burlington, VT 05401**

Dear Ms. McGuire:

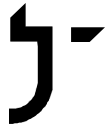
In accordance with our proposal and authorization to proceed, John Turner Consulting, Inc. (JTC) has performed a geotechnical investigation for the above captioned project. Presented herein and attached are the results of the site subsurface investigation, and our recommendations regarding the design and construction of the foundation, and other geotechnical related concerns or issues.

This submission completes our services under the approved contract. We appreciate the opportunity to assist you on this venture and we look forward to working with you on this project through its completion. Please do not hesitate to contact us if you have any questions or require additional information.

Sincerely,  
**JOHN TURNER CONSULTING, INC.**



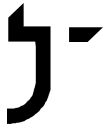
Stephen C. Lanne, PE  
Vice President of Engineering  
19 Dover Street  
Dover, NH 03820  
[slanne@consultjtc.com](mailto:slanne@consultjtc.com)  
Ph: (413) 222-1675



## Table of Contents

|                                                                    |                                                          |    |
|--------------------------------------------------------------------|----------------------------------------------------------|----|
| 1.0                                                                | INTRODUCTION .....                                       | 3  |
| 2.0                                                                | PROJECT INFORMATION.....                                 | 3  |
| 2.1                                                                | Site Description .....                                   | 3  |
| 2.2                                                                | Regional Geologic Setting .....                          | 3  |
| 2.3                                                                | Proposed Development .....                               | 3  |
| 3.0                                                                | GEOTECHNICAL EXPLORATIONS .....                          | 4  |
| 3.1                                                                | Soil Borings.....                                        | 4  |
| 3.2                                                                | Infiltration Tests .....                                 | 4  |
| 3.2.1                                                              | Infiltration Testing Results .....                       | 5  |
| 4.0                                                                | GEOTECHNICAL LABORATORY TESTING .....                    | 6  |
| 5.0                                                                | SUBSURFACE CONDITIONS.....                               | 6  |
| 5.1                                                                | Soils.....                                               | 6  |
| 5.1.1                                                              | Surface Materials.....                                   | 6  |
| 5.1.2                                                              | Existing Fill.....                                       | 6  |
| 5.1.3                                                              | Glaciolacustrine Deposits.....                           | 7  |
| 5.2                                                                | Bedrock.....                                             | 7  |
| 5.3                                                                | Groundwater.....                                         | 7  |
| 6.0                                                                | GEOTECHNICAL ANALYSIS & RECOMMENDATIONS.....             | 7  |
| 6.1                                                                | Site Preparation and Grading .....                       | 9  |
| 6.2                                                                | Shallow Foundations and Foundation Walls .....           | 10 |
| 6.3                                                                | Floor Slab-On-Grade .....                                | 13 |
| 6.4                                                                | Seismic Considerations .....                             | 14 |
| 6.5                                                                | Re-Use of Site Soils .....                               | 14 |
| 6.6                                                                | Construction Monitoring and Quality Control Testing..... | 14 |
| 6.7                                                                | Additional Considerations.....                           | 15 |
| 7.0                                                                | CLOSING .....                                            | 16 |
| APPENDIX A: Limitations                                            |                                                          |    |
| APPENDIX B: Recommended Soil Gradation & Compaction Specifications |                                                          |    |
| APPENDIX C: Recommended design Parameters for Unbalanced Walls     |                                                          |    |
| APPENDIX D: Concept Plan & Exploration Location Plan               |                                                          |    |
| APPENDIX E: Exploration Logs & Key to Symbols and Descriptions     |                                                          |    |
| APPENDIX F: Geotechnical Laboratory Testing Reports                |                                                          |    |
| APPENDIX G: Site Photographs                                       |                                                          |    |





## 1.0 INTRODUCTION

John Turner Consulting, Inc. (JTC) is pleased to present this *Geotechnical Investigation Report* for the proposed redevelopment of the medical building located at 300 Flynn Road in Burlington, Vermont. JTC conducted geotechnical explorations, laboratory testing, and engineering evaluations in general accordance with our proposed scope of services submitted on November 11, 2022.

The purpose of the geotechnical investigation was to obtain information on the subsurface conditions at the site and to provide geotechnical engineering recommendations to support the planning, design, and construction of the proposed development. Geotechnical explorations and laboratory testing services were performed in December of 2022, and January of 2023. The contents of this report are subject to the attached *Limitations*.

## 2.0 PROJECT INFORMATION

The following subsections provide general descriptions of the site, the regional geologic setting, and the proposed development.

### 2.1 Site Description

The property is currently developed with an approximately 21,000 square foot (s.f.) building, with associated parking lots, driveways, and landscaped areas. The site is bounded by Pine Street to the east, Flynn Avenue to the south, and other commercial properties to the north and west. The north side of the site slopes downward towards a creek.

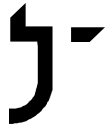
### 2.2 Regional Geologic Setting

JTC's review of the surficial geologic maps of the area, as well the previous geotechnical investigations of the area, indicate soils at the site most likely consist of fill over glaciolacustrine deposits mainly consisting of silts and clays, all underlain by glacial till and bedrock.

### 2.3 Proposed Development

JTC understands that the proposed development involves the demolition of the current structure and the construction of a new, 51,000 square feet (s.f.), three story building, with associated driveways and parking lots. Ground level, under building parking is proposed below portions of the proposed building, and part of the south end of the building will have a basement. Proposed site plans show grading will include moderate cuts and fills, i.e, up to about 6 feet or so, to achieve design grades

Preliminary site-specific structural loading was provided by the structural engineer. As such, JTC has used the following structural loading conditions:



- Column loads will be on the order of 220 kips or less; and
- Live loads applied to the floor slab-on-grade will be on the order of 150 pounds per square foot (psf) or less.

### 3.0 GEOTECHNICAL EXPLORATIONS

#### 3.1 Soil Borings

JTC subcontracted Soil Exploration Corp to perform five (5) geotechnical test borings, designated as B-1 through B-5 (including B-2A), one (1) ledge probe designated as P-1, and six (6) infiltration tests, designated as IT-1 through IT-6, via a truck-mounted drill rig. JTC directed the drilling, testing, and sampling activities and logged the subsurface conditions encountered at each boring location.

The exploration locations were selected in relation to the existing site features and proposed development, and under the constraints of drill rig access and utility conflicts. Subsequently, the relative location of each boring was established via measurements from existing site features and scaling the dimensions onto the provided plan(s). The attached *Exploration Location Plan* depicts the approximate exploration locations.

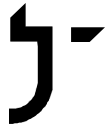
The explorations were advanced to depths ranging from 5.0 feet to 38.0 feet below the ground surface (bgs) utilizing 4¼-inch inner-diameter hollow stem augers (HSAs). As the explorations were advanced, standard penetration tests (SPTs) were conducted at regular intervals and soil samples were obtained via 2-inch outside-diameter split-spoon samplers driven by a 140-pound automatic hammer. SPTs were performed in general accordance with ASTM D1586, Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils. Soil samples were sealed in moisture-tight containers and returned to JTC's office for further review, classification, and/or geotechnical laboratory testing. The explorations were backfilled with soil cuttings upon completion of drilling.

Detailed records of the drilling, testing, and sampling performed, and the soil, bedrock, and groundwater conditions observed at each test boring location are provided on the attached *Exploration Logs*.

#### 3.2 Infiltration Tests

Infiltration testing was performed in general accordance with local standards. The testing procedure at each location was performed as follows:

- A borehole was advanced to the infiltration depth using hollow stem augers and a 3.5-inch diameter Schedule 40 polyvinyl chloride (PVC) casing was placed inside the hollow stem auger and seated into the soils at the bottom of the hole. The auger was then removed and the annulus between the pipe and the borehole was backfilled with



bentonite chips for approximately 2 feet, and then soil cuttings for the remaining depth of the hole;

- An approximately 2-inch thick layer of drainage gravel was placed at the bottom of the casing to protect the soil from scouring and sedimentation;
- The casing was filled with water to about 2 feet above the bottom of the boring to pre-soak for approximately 24 hours; After the 24-hour soaking period, JTC performed infiltration testing at the prepared locations.

The testing procedure consisted of:

- Filling the pipe with water to a depth of 2 feet above the bottom of the casing;
- Taking regular water level measurements over the following hour;
- Refilling the water after each hour and repeating the process for a total of four cycles, if necessary.

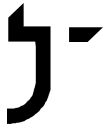
### 3.2.1 Infiltration Testing Results

The infiltration testing results are summarized in the following table:

| Table 1 – Summary of Infiltration Testing Results |          |           |                                    |         |         |         |                               |
|---------------------------------------------------|----------|-----------|------------------------------------|---------|---------|---------|-------------------------------|
| Infiltration Test #                               | Location | Soil Type | Measured Infiltration Rate (in/hr) |         |         |         | Average Measured Rate (in/hr) |
|                                                   |          |           | Round 1                            | Round 2 | Round 3 | Round 4 |                               |
| IT-1                                              | IT-1     | SM        | 12                                 | 8       | 11      | 10      | 10.3                          |
| IT-2                                              | IT-2     | CL        | 0                                  | 0       | 0       | 0       | 0                             |
| IT-3                                              | IT-3     | SM        | 0                                  | 0       | 0       | 0       | 0                             |
| IT-4                                              | IT-4     | CL        | 0                                  | 0       | -       | -       | 0                             |
| IT-5                                              | IT-5     | CL        | 0                                  | 0       | -       | -       | 0                             |
| IT-6                                              | IT-6     | CL        | 0                                  | 0       | -       | -       | 0                             |

No factors of safety have been applied to the measured rates presented in the table. JTC recommends applying a minimum safety factor of 2 to the measured rates for design purposes. The infiltration test logs are provided in the attached *Exploration Logs*.





## 4.0 GEOTECHNICAL LABORATORY TESTING

JTC selected representative soil samples for geotechnical laboratory testing. The following tests were performed:

- 3 Moisture content determinations
- 3 Particle-size analyses
- 2 Hydrometer analyses
- 2 Atterberg Limits determinations
- 2 Shelby Tube Logs and Testing
- 1 One-dimensional Consolidation test

Geotechnical laboratory testing was performed in general accordance with ASTM procedures. Test results are provided on the attached *Geotechnical Laboratory Testing Reports*.

## 5.0 SUBSURFACE CONDITIONS

The following subsections describe the site soil, bedrock, and groundwater conditions encountered, based on results of the geotechnical explorations and laboratory testing. Detailed descriptions of the conditions observed at each test boring are provided on the attached *Test Boring Logs*.

### 5.1 Soils

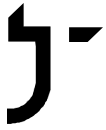
The overburden soils encountered at the test boring locations appear to be consistent with those described by the published geologic data. The primary soil strata are briefly described in the paragraphs below.

#### 5.1.1 Surface Materials

Surface materials encountered at B-1 consisted primarily of man-placed organic mulch, approximately 0.4 feet thick, while the materials encountered at the surface of the remaining borings was interpreted as Topsoil and was about 0.25 feet to 1 foot thick. The Topsoil at B-2 was composed primarily of brown Silty Sand (SM) with organics, while the Topsoil at B-3 through B-5 consisted primarily of Sandy Lean Clay (CL) with organics. These soils exhibited varying relative density ranging from loose to stiff based on SPT N-Values.

#### 5.1.2 Existing Fill

Soils interpreted as Fill were encountered underlying the Surface Materials at B-1, to depths of about 10 feet bgs. The existing Fill materials consisted primarily of brown, Silty Sand (SM) with trace gravel. These soils exhibited varying relative density ranging from loose to medium dense based on SPT N-Values.



### 5.1.3 Glaciolacustrine Deposits

Native soils interpreted to be Glaciolacustrine Deposits were encountered underlying the surficial materials at B-2 through B-5, and below the Fill materials at B-1. The Glaciolacustrine Deposits consisted primarily of brown to grey, Lean Clay (CL) with varying amounts of silt and sand. Based on SPT N-Values, these soils were typically considered to be medium stiff to stiff in the upper portion of the layer, then soft to very soft in the lower portion of the layer.

### 5.2 Bedrock

Practical refusal to further penetration of the augers was encountered at all exploration locations except B-5. The approximate depth to practical refusal and the estimated refusal material are tabulated below.

| Exploration # | Refusal Type and Depth<br>(feet bgs) | Estimated Refusal<br>Material |
|---------------|--------------------------------------|-------------------------------|
| B-1           | Auger Refusal – 35.0                 | Bedrock                       |
| B-2           | Auger Refusal – 5.0                  | Bedrock                       |
| B-2A          | Auger Refusal – 5.0                  | Bedrock                       |
| B-3           | Auger Refusal – 38.0                 | Bedrock                       |
| B-4           | Auger Refusal – 30.0                 | Bedrock                       |
| B-5           | Auger Refusal – (N/A)                | (N/A)                         |
| P-1           | Auger Refusal – 4.5                  | Bedrock                       |

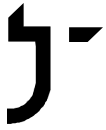
### 5.3 Groundwater

Groundwater was encountered at B-1 at a depth of approximately 25 feet bgs, and at B-3 through B-5 at a depth of approximately 15 feet bgs at the time of drilling. However, short-term (i.e., during drilling, upon completion of drilling, and/or a few hours after drilling) water levels observed in test borings performed in silty soils should be considered approximate.

JTC estimates that this investigation occurred during a period of seasonally low ground water. Site groundwater levels should be expected to fluctuate seasonally and in response to precipitation events, tides, construction activity, site use, and adjacent site use. In addition, water can become temporarily perched above relatively low permeability soils and/or the bedrock surface.

## 6.0 GEOTECHNICAL ANALYSIS & RECOMMENDATIONS

The evaluation of the site and the proposed development was based on the subsurface conditions encountered at the exploration locations, results of geotechnical laboratory testing, provided site plans/grading, and provided structural loading conditions, as described herein.



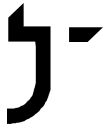
The Existing Fill and Glaciolacustrine Deposits are considered unsuitable for direct support of shallow foundations and slabs-on-grade. The Existing Fill is generally loose, indicating the materials were not placed under controlled, engineered conditions. The lower, soft Glaciolacustrine Deposits would consolidate under the proposed loading, making them unsuitable for the direct support of shallow foundations. Settlement analysis of these soils indicate estimated settlement exceeding 2.0 inches. In addition, the likely presence of Bedrock at foundation level within portions of the proposed buildings will lead to dramatically differing bearing conditions that would likely result in undesirable differential settlement if foundations were bearing on both Bedrock and Glaciolacustrine Deposits.

In order to provide a more uniform bearing condition, JTC recommends that ground improvements, e.g., installation of Aggregate Piers/Rigid Inclusions, be implemented to provide suitable bearing and stiffness to minimize post-construction settlement of shallow foundations.

The Aggregate Pier/Rigid Inclusion method is a common ground improvement method. In general, Aggregate Pier/Rigid Inclusion foundation elements would be constructed by drilling (or displacing) 18-inch to 30-inch diameter cavities through the Existing Fill and Glaciolacustrine Deposits, terminating in the underlying Bedrock. The cavities are then backfilled with crushed stone that is densified with impact and/or vibratory compaction. The densification process pushes the crushed stone radially outward into the sidewalls of the cavities, thereby increasing the lateral stresses in the matrix soil surrounding the Aggregate Pier elements. The end product is the formation of very stiff aggregate elements that are extremely efficient in providing foundation support and reducing foundation settlement. Aggregate Piers are sometimes grouted (via Portland cement) where soft and/or organic soils are present. In some cases, the cavities are backfilled with concrete instead of crushed stone. The grouted and/or concrete elements are even stiffer than the traditional Aggregate Pier and are commonly referred to as Rigid Inclusions. Aggregate Piers and/or Rigid Inclusions are typically designed and constructed by a specialty design-build firm and/or Geo-Contractor. Some products include patented/licensed technology. The design of Aggregate Piers/Rigid Inclusions and/or equivalent should be completed by a Professional Engineer licensed in Vermont. The design should be provided as a Technical Submittal.

Subsequent to ground improvement, JTC believes that the proposed building can be supported upon shallow foundations bearing on Bedrock, *Structural Fill* or Crushed Stone, or the design-build Ground Improvement surface, provided that the geotechnical design and construction recommendations presented herein are satisfied. Additionally, due to the limitations to access caused by the existing building, the extent of the shallow bedrock and thickness of the clay could not be adequately mapped. JTC recommends further boring explorations of the site be conducted once the building is demolished, to accurately map the subsurface conditions. This will allow for a more accurate and efficient ground improvement and traditional foundation design.

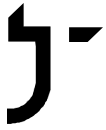




## 6.1 Site Preparation and Grading

Site preparation and grading should be performed in accordance with the following procedures:

- A geotechnical engineer should directly observe site preparation and grading activities;
- The site soils contain substantial proportions of fine sand, silt and clay, and may degrade and/or become unworkable when subjected to construction traffic or other disturbance during wet conditions. As such, site preparations, grading, and earthworks should be performed during a dry season if possible. The Contractor shall be aware of these conditions and must take precautions to minimize subgrade disturbance. Such precautions may include diverting storm run-off away from construction areas, reducing traffic in sensitive areas, minimizing the extent of exposed subgrade if inclement weather is forecast, backfilling excavations and footings as soon as practicable, grading (and compacting) exposed subgrades to promote surface water run-off, and maintaining an effective dewatering program, as necessary. Over-excavation to remove degraded or unworkable subgrade soils should be anticipated and budgeted (cost and schedule);
- Any existing buildings, structures, and/or associated foundations (including footings, foundation walls, slabs-on-grade, and/or basements) should be completely removed from within proposed building areas and replaced/backfilled with properly placed and compacted *Structural Fill*. Any existing structures within paved areas should be removed to a depth of at least 3 feet below the pavement section. Slabs or other large portions of concrete left in place should be periodically broken to prevent ponding water;
- Any existing subsurface utilities and underground utility structures should be completely removed from the footprint of the proposed buildings and replaced/backfilled with properly placed and compacted *Structural Fill*. Any existing subsurface utilities in proposed pavement areas should be removed and/or appropriately abandoned in place to prevent transmitting water, as approved by the on-site geotechnical engineer;
- The site should be cleared and stripped of any existing trees/vegetation and asphalt-concrete pavement not designated to remain; Topsoil, rootmat, forest mat; loamy/organic-laden Subsoil; and any otherwise unsuitable materials;
- Bedrock may impact excavation/construction of shallow foundations and site utilities, depending on the final design grading. Based on the depth to refusal on presumed bedrock, the planned partial basements, and our expectation of some cutting to achieve finished grade, we expect bedrock removal may be required for foundation construction in some areas. A variety of removal methods should be anticipated and budgeted for, including mechanical excavation, ripping, hoe-ram, and pneumatic jackhammering (in the case of small or confined areas);
- Following clearing, stripping, removal of any unsuitable soil, and/or cutting, the exposed subgrade soils should be proof-rolled with successive passes aligned perpendicularly. Within the building pad, the exposed subgrade should be proof-rolled and subject to vibratory densification via at least 8 passes using a large (10-ton) smooth-drum roller and a crisscross pattern. Proof-rolling/densification should not be performed if/when the



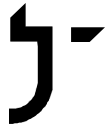
exposed subgrade soils are wet (i.e., due to presence of groundwater, stormwater, perched water, etc.) because this may result in soil pumping and instability. Therefore, the proof-rolling efforts, including the number of passes and whether to employ static or vibratory methods, should be directed by the on-site geotechnical engineer;

- Any loose, soft, wet, and/or otherwise unsuitable soils (typically evidenced by rutting, pumping, and/or deflection of the subgrade) should be over-excavated to expose suitable soils, or other remedial measures should be taken, as approved by the on-site geotechnical engineer; and
- The resulting excavation should then be backfilled with properly placed and compacted *Structural Fill*.
- Where Bedrock is encountered at or above design foundation level, Bedrock should be removed to a depth of at least 24 inches below the bottom of foundation. Loose rock material and high spots should be removed to provide a fairly uniform bearing surface;
- *Structural Fill* should be used for subgrade fill within the building pad. The placement of *Structural Fill* materials to achieve design subgrades in the building pad should not begin until the exposed soil or bedrock surface has been directly observed and approved by the on-site geotechnical engineer;
- *Common Fill* is acceptable for subgrade fill in parking and driveway areas. The placement of *Common Fill* materials to achieve design subgrades in pavement areas should not begin until the exposed subgrade soils have been directly observed and approved by the on-site geotechnical engineer; and
- *Structural Fill* and *Common Fill* materials and placement and compaction requirements are provided in the attached Specifications.

## 6.2 Shallow Foundations and Foundation Walls

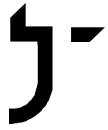
Based on the subsurface conditions encountered at the exploration locations and our current understanding and assumptions relative to the proposed development, the following foundation design recommendations are provided. The recommendations for shallow foundations assume that the recommended ground improvements, i.e., Aggregate Piers/Rigid Inclusions, will be completed:

- The Existing Fill and Glaciolacustrine Deposits are not suitable for direct support of shallow foundations in their current condition;
- The buildings may be supported on a system of continuous and/or isolated shallow spread footings bearing on improved existing soils and/or *Structural Fill* built-up from Bedrock subgrades. We expect Bedrock will exist at foundation level in some areas. In order to provide a more uniform and elastic response to foundation loading, foundations should not bear directly on Bedrock. A minimum 24-inch thick cushion layer of *Structural Fill* should be placed below foundations bearing on Bedrock to help reduce effects of differential settlement;



- Following ground improvements, shallow foundations may be designed using an allowable bearing pressure as determined by the design-build submittal. Since we expect foundations to bear on both bedrock and ground improvement subgrades, the extents of which may not be completely clear until the time of construction, we recommend the foundation design proceed using an allowable bearing pressure of 4,000 psf. Design bearing pressures may be increased by one-third ( $\frac{1}{3}$ ) when considering seismic and or transient wind loading conditions;
- Continuous wall footings should have a minimum width of 3 feet. Isolated column footings should have a minimum width of 5 feet;
- Exterior footings should be founded at least 5 feet below the lowest adjacent grade to provide adequate frost protection. Interior footings in heated portions of the building should be founded at least 2 feet below FFE to develop adequate bearing capacity; and
  - If shallow competent Bedrock is encountered during excavations for exterior footings, the footings can be founded at a minimum depth of 2 feet below the adjacent grade, atop at least 24 inches of *Structural Fill* (cushion layer) placed on clean competent Bedrock, provided that the condition of the Bedrock is inspected by the on-site geotechnical engineer;
  - If weathered Bedrock is encountered during excavations for exterior footings, the footings should be founded at least 5 feet below final grade, as described herein.
- For footings founded on clean competent Bedrock (and the recommended *Structural Fill* cushion layer), total post-construction settlements should be minimal. We recommend the design-build ground improvement submittal consider stiffness of the system, in addition to strength, in order to limit the potential for differential settlement;
- A foundation drain system should be installed around the perimeter of the proposed building at the exterior toe of the exterior footings. Foundation drains should consist of 4-inch diameter PVC-SDR35 perforated pipe encased in at least 10 inches of  $\frac{3}{4}$ -inch stone protected with a filter fabric such as Mirafi 140N or equal. The drains should be graded to positively drain to a suitable discharge point away from the proposed structure. Drains should not be connected to surface or roof drain discharge points. Clean-outs should be located at bends and no greater than 150 feet on-center. It is recommended that a backflow preventer be installed at the outlet of the drains to reduce the impact of potential surcharges;
- A waterproofing specialist should design a comprehensive waterproofing system for the basement area of the proposed building. JTC recommends that the waterproofing design consider the potential for perched water conditions, above and within the low permeability Glaciolacustrine Deposits. Typical, waterproofing systems include any or all of the following:
  - Utilization of waterstops at construction joints in below grade walls, footings, slabs, and other intersections/cold joints where a waterproof system is required.





The waterstops prevent the passage of water across these construction joints.

- Application of multiple perpendicular coats of asphalt-modified polyurethane (or equivalent) to the exterior of the entire foundation;
  - Installation of rubberized asphaltic membrane sheets/rolls to the exterior of the entire foundation; and
  - Installation of bentonite waterproofing panels (bentonite clay sandwiched between cardboard panels). The highly expansive clay forms an impenetrable barrier once water contacts the panels.
- Recommended lateral earth pressures and friction factors for unbalanced/basement walls are provided in *Appendix C*.

Recommendations for shallow foundation subgrade preparation and construction are provided as follows:

- A geotechnical engineer or his/her representative should directly observe foundation subgrade preparation activities;
- If shallow and/or perched groundwater is encountered, it must be continuously maintained at least 2 feet below the bottom of excavation and subsequent construction grade until the backfilling is complete;
- The subgrade soils will be sensitive to moisture and will readily disturb or soften if exposed to wet conditions during construction activities. Therefore, the final foot, at a minimum, of excavation for foundations should be performed using a smooth-edged cutting bucket (no teeth) to minimize subgrade disturbance. Furthermore, if wet conditions are present or anticipated due to groundwater seepage, perched groundwater, and/or precipitation/stormwater, the foundation subgrade should be protected with a 6-inch (minimum) thick layer of  $\frac{3}{4}$ -inch minus crushed stone encased in a geotextile fabric (e.g., Mirafi 140N or equal). The fabric and crushed stone shall be placed immediately upon exposure of the foundation subgrade soils and densified with a plate compactor until exhibiting stable conditions. The purpose of the crushed stone is to protect the subgrade soils from disturbance, facilitate construction dewatering (if necessary), and provide a dry/stable subgrade upon which to progress construction.
- Foundation subgrades should be proof-rolled using a large smooth-drum roller with successive perpendicular passes.
- Where Bedrock subgrade is encountered in some areas of the proposed building;
  - The exposed Bedrock must be scraped clean of soil and any loose/weathered rock or severely fractured rock should be removed;
  - The footing subgrade should be approximately level. Bedrock surfaces that exceed 6H:1V in slope should be step-serrated or suitably benched;
  - Smooth surfaces should be roughened or serrated; and
  - A minimum 24-inch thick lift of *Structural Fill* should be placed between the footing

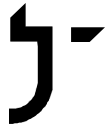
and the bedrock surface to provide a more uniform and elastic bearing subgrade. The purpose of the crushed stone (i.e., cushion base) is to minimize differential settlements.

- Prior to setting forms and placing reinforcing steel, a geotechnical engineer should directly observe footing subgrades;
  - Footing subgrades should be level or suitably benched and free of standing water and/or debris;
  - Loose, soft, wet, frozen, or otherwise unsuitable soils should either be re-compacted or over-excavated to a suitable subgrade, as approved by the on-site geotechnical engineer; and
  - Over-excavations should be backfilled with properly placed and compacted *Structural Fill* as approved by the on-site geotechnical engineer.
- Foundation subgrade soils should be protected against physical disturbance, precipitation, and/or frost throughout construction. Surface water run-on/run-off should be diverted away from open foundation excavations. The Contractor shall ultimately be responsible for the means and methods to protect the foundation subgrade during construction;
- Interior footings, piers, and/or walls and the interior side of balanced perimeter foundation walls should be backfilled with *Clean Granular Fill* and/or 3-inch minus material meeting the requirements of *Structural Fill*, as described in the attached *Tables*;
- Exterior footings and exterior side of balanced perimeter foundation walls should be backfilled with non-frost-susceptible fill in order to mitigate potential adverse effects of frost. Exterior footing and foundation wall backfill should consist of well-graded, free-draining, granular soil conforming to the requirements of *Clean Granular Fill*, as described in the attached *Tables*;
- Backfill for footings and foundation walls should be placed in uniform horizontal lifts having a maximum loose lift thickness of 8 inches and compacted to 95 percent of its modified proctor maximum dry density (MPMDD; per ASTM D1557). Thinner lifts may be required in order to achieve the required compaction criteria; and
- To minimize the potential for foundation wall damage during the backfill and compaction activities, it is recommended that foundation wall backfill be placed in a manner that maintains a balanced fill height on both sides of the wall (except for unbalanced walls).

### 6.3 Floor Slab-On-Grade

Design recommendations for the floor slab-on-grade are provided as follows:

- The slab area should be improved with a design-build aggregate pier or rigid inclusion solution. The floor slab-on-grade should be underlain by a base course layer consisting of a minimum 12-inch thick layer of *Clean Granular Fill* placed over improved soils or *Structural Fill*, to provide a capillary break and a stable working surface;



- A modulus of vertical subgrade reaction,  $k_{vi}$ , of 200 pounds per cubic inch (pci) should be available for structural design of floor slabs-on-grade, provided that the subgrade is prepared as recommended;
- The floor slab should be isolated structurally from foundation walls and columns/piers to allow for differential movement; and
- The requirement for under slab drainage and a moisture/vapor barrier beneath floor slabs-on-grade should be evaluated by the architect and/or the structural engineer, based on the building's specific interior usage requirements.

Additional recommendations for slab-on-grade subgrade preparation and construction are provided as follows:

- A geotechnical engineer should directly observe the subgrade soils prior to the placement of fill within the slab area;
- The subgrade should be level and free of standing water and/or debris;
- Loose, soft, wet, frozen, or otherwise unsuitable soils should either be re-compacted or over-excavated to a suitable subgrade, as approved by the on-site geotechnical engineer; and
- Over-excavations should be backfilled with properly placed and compacted *Structural Fill*.

#### 6.4 Seismic Considerations

Based on site class definitions of the American Society of Civil Engineers (ASCE) Standard 7-10, Minimum Design Loads for Buildings and Other Structures and the conditions encountered at the test boring locations, the site is classified as:

**Site Class D: Stiff Soil.**

Liquefaction refers to the loss of strength in saturated cohesionless soils due to the buildup of pore water pressures during cyclic or seismic loading. Based on the conditions encountered at the test boring locations, the site is not considered to be susceptible to liquefaction.

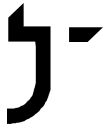
#### 6.5 Re-Use of Site Soils

The excavated materials encountered at the site are not expected to be suitable for re-use as *Structural Fill*, *Clean Granular Fill*, or *Common Fill* due to high fines content. These soils may be re-used in areas to be landscaped, subject to conformance with the project specifications.

#### 6.6 Construction Monitoring and Quality Control Testing

A qualified geotechnical engineer or representative should be retained to review the site preparation and grading activities and foundation subgrade preparations, at a minimum. Similarly, quality control testing, including in-place field density and moisture tests, should be performed to confirm that the specified compaction is achieved. It is recommended that JTC be





retained to provide earthwork construction monitoring and quality control testing services.

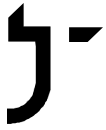
Quality control testing recommendations are provided as follows:

- The Geotechnical Engineer should be on-site full time to monitor the installation of the Ground Improvement system;
- During site grading and foundation subgrade preparation, 3 field density tests should be performed for every 5,000 square feet (per lift) of *Structural Fill* placement, at a minimum. At least 3 tests should be performed on each lift of material even if the lift is less than 5,000 square feet;
- During foundation wall backfilling, 3 field density tests should be performed for every 100 linear feet (per lift) of fill placement, at a minimum. At least 3 tests should be performed on each lift of material even if the lift is less than 100 linear feet;
- During placement and compaction of *Clean Granular Fill* as the base course below the floor slab-on-grade and sidewalks, 3 field density tests should be performed for every 5,000 square feet of placement. At least 3 tests should be performed on each lift of material even if the lift is less than 5,000 square feet;
- During backfilling of utility trenches, at least 1 test should be conducted on *Structural Fill* per 50 linear feet (per lift) of trench; and
- During site grading and pavement subgrade preparation, 3 field density tests should be performed for every 5,000 square feet (per lift) of *Common Fill*, at a minimum. At least 3 tests should be performed on each lift even if the lift is less than 5,000 square feet.

## 6.7 Additional Considerations

Additional design recommendations are provided as follows:

- Exterior concrete sidewalks should be underlain by at least 12 inches of *Clean Granular Fill*. The thickness of the *Clean Granular Fill* should be increased to no less than 18 inches for exterior concrete slabs located adjacent to exterior doorways and ramps to provide additional frost protection at building entry/exit points;
- Roof drains or similar features should be provided to collect roof run-off and prevent ponding near the building. Roof drains and other stormwater controls should not discharge to foundation drains;
- The exterior ground surface adjacent to the building should be sloped away from the building to provide for positive drainage. Similarly, the final surface materials adjacent to the building should be relatively impermeable to reduce the volume of precipitation infiltrating into the subsurface proximate to building foundations. Such impermeable materials include cement concrete, bituminous concrete, and/or vegetated silty/clayey topsoil; and
- Permanent fill or cut slopes should have a maximum slope of 2.5H:1V (horizontal to vertical) or flatter for dry conditions. Permanent fill or cut slopes should be no steeper



than 3H:1V for wet/submerged conditions (e.g., stormwater basin) unless a properly designed surface slope stabilization system (e.g. rip rap, geosynthetics) is provided.

Additional construction considerations/recommendations are provided as follows:

- Safe temporary excavation and/or fill slopes are the responsibility of the Contractor. Excavations should be conducted in accordance with local, state, and federal (OSHA) requirements, at a minimum. If an excavation cannot be properly sloped or benched due to space limitations, adjacent structures, and/or seepage, the Contractor should install an engineered shoring system to support the temporary excavation;
- Subgrade conditions will be influenced by excavation methods, precipitation, stormwater management, groundwater control(s), and/or construction activities. Most of the site soils are poorly-drained, moisture-sensitive, and considered susceptible to disturbance when exposed to wet conditions and construction activities. As such, the Contractor should be aware of these conditions and must take precautions to minimize subgrade disturbance. Such precautions may include diverting storm run-off away from construction areas, reducing traffic in sensitive areas, minimizing the extent of exposed subgrade if inclement weather is forecast, backfilling excavations and footings as soon as practicable, and maintaining an effective dewatering program, as necessary;
- Proper groundwater control and stormwater management are necessary to maintain site stability. Groundwater should be removed in advance and continuously maintained at least 2 feet below the working construction grade until earthworks and/or backfilling are complete;
- If groundwater seepage and/or wet soils due to shallow groundwater are observed, a  $\frac{3}{4}$ -inch minus crushed stone base should be placed atop the exposed subgrade soils. The stone should be immediately placed atop the undisturbed subgrade and then tamped with a plate compactor until exhibiting stable conditions. The stone should be protected, as required, with a geotextile filter fabric such as Mirafi 140N or equal. The purpose of the stone base is to protect the wet subgrade, facilitate dewatering, and provide a dry/stable base upon which to progress construction; and
- All slopes should be protected from erosion during (and after) construction.

## 7.0 CLOSING

We trust the contents of this report are responsive to your needs at this time. Should you have any questions or require additional assistance, please do not hesitate to contact our office.

## **APPENDIX A: LIMITATIONS**

### Explorations

1. The analyses and recommendations presented in this report are based in part upon the data obtained from widely-spaced subsurface explorations. Subsurface conditions between exploration locations may vary from those encountered at the exploration locations. The nature and extent of variations between explorations may not become evident until construction. If variations appear, it will be necessary to re-evaluate the recommendations of this report.
2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretation of widely-spaced explorations and samples; actual strata transitions are probably more gradual. For specific information, refer to the individual test pit and/or boring logs.
3. Water level readings have been made in the test pits and/or test borings under conditions stated on the logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors differing from the time the measurements were made.

### Review

4. It is recommended that John Turner Consulting, Inc. be given the opportunity to review final design drawings and specifications to evaluate the appropriate implementation of the geotechnical engineering recommendations provided herein.
5. In the event that any changes in the nature, design, or location of the proposed areas are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed, and conclusions of the report modified or verified in writing by John Turner Consulting, Inc.

### Construction

6. It is recommended that John Turner Consulting, Inc. be retained to provide geotechnical engineering services during the installation phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

### Use of Report

7. This report has been prepared for the exclusive use of the addressee for the noted project. All considerations are based on the available information and is in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.
8. This report has been prepared for this project by John Turner Consulting, Inc. This report was completed for preliminary design purposes and may be limited in its scope to complete an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to preliminary geotechnical design considerations.



## APPENDIX B: RECOMMENDED SOIL GRADATION & COMPACTION SPECIFICATIONS

**TABLE 1: Structural Fill**

| SIEVE SIZE | PERCENT PASSING<br>BY WEIGHT |
|------------|------------------------------|
| 5-inch     | 100                          |
| ¾-inch     | 60 - 100                     |
| No. 4      | 20 - 80                      |
| No. 200    | 0 - 10                       |

**NOTES:**

1. For use as structural load support below foundations and within the building pad. Structural Fill placed beneath building foundations should include the Footing Zone of Influence which is defined as that area extending laterally one foot from the edge of the footing then outward and downward at a 1:1.5 (H:V) splay.
2. ¾-inch crushed stone may be used in wet conditions.
3. Structural Fill should be free of construction and demolition debris, frozen soil, organic soil, peat, stumps, brush, trash, and refuse;
4. Structural Fill should not be placed on soft, saturated, or frozen subgrade soils;
5. Structural Fill should be placed in lifts not exceeding 12 inches for heavy vibratory rollers and 8 inches for vibratory plate compactors.
6. Place and compact within  $\pm 3\%$  of optimum moisture content.
7. Compact to at least 95% relative compaction per ASTM D1557.
8. The adequacy of the compaction efforts should be verified by field density testing.

**TABLE 2: Clean Granular Fill**

| SIEVE SIZE | PERCENT PASSING BY WEIGHT |
|------------|---------------------------|
| 3-inch     | 100                       |
| ¾-inch     | 60 – 90                   |
| No. 4      | 20 – 70                   |
| No. 200    | 2 – 8                     |

**NOTES:**

1. Should consist of crushed stone beneath the concrete pad, as approved by on-site geotechnical engineer.
2. For minimum 9-inch base below the floor slab-on-grade.
3. For minimum 12-inch base for exterior concrete slabs exposed to frost.
4. For minimum 18-inch base at exterior ramps, aprons, and loading bays adjacent to entrances/exit ways.
5. For use as footing and foundation wall backfill.
6. For use as backfill behind unbalanced foundation/retaining walls.
7. Place in lifts not exceeding 12 inches for heavy vibratory rollers and 8 inches for vibratory plate compactors.
8. Place and compact within  $\pm 3\%$  of optimum moisture content.
9. Compact to at least 95% relative compaction per ASTM D1557.
10. Compact to at least 95% relative compaction per ASTM D1557 when placed as foundation wall backfill in conjunction with a bond break.
11. The adequacy of the compaction efforts should be verified by field density testing.

**TABLE 3: Common Fill**

| SIEVE SIZE | PERCENT PASSING BY WEIGHT |
|------------|---------------------------|
| 6-inch     | 100                       |
| ¾-inch     | 60 – 100                  |
| No. 4      | 20 – 85                   |
| No. 200    | 0 – 25                    |

**NOTES:**

1. For use as common/subgrade fill in parking areas and roadway embankments.
2. For use as foundation wall backfill if used in conjunction with a bond break and sized/screened to 3-inch minus.
3. Place in lifts not exceeding 12 inches.
4. Maximum stone size should not exceed ½ the actual lift thickness.
5. Compact to at least 92% relative compaction per ASTM D1557 when placed as subgrade fill in parking areas or roadway embankments.
6. Compact to at least 95% relative compaction per ASTM D1557 when placed as foundation wall backfill in conjunction with a bond break.
7. The adequacy of the compaction efforts should be verified by field density testing.

## APPENDIX C: RECOMMENDED DESIGN PARAMETERS FOR UNBALANCED WALLS

Lateral earth pressures for the structural design and stability analysis of unbalanced foundation walls (basement walls, retaining walls, etc.) are provided herein. The following table outlines the recommended lateral earth pressure coefficients and equivalent fluid weights:

| WALL<br>CONDITION | LATERAL<br>TRANSLATION ( $\Delta/H$ ) | EARTH PRESSURE<br>COEFFICIENT (K) |
|-------------------|---------------------------------------|-----------------------------------|
| restrained        | 0                                     | $K_o = 0.50$                      |
| no restraint      | 0.002                                 | $K_a = 0.31$                      |
| no restraint      | 0.02                                  | $K_p = 3.25$                      |
| seismic           | n/a                                   | $K_{eq}$                          |

where:  $\Delta$  = movement at top of wall by rotation or lateral translation

H = height of wall

The recommended lateral earth parameters are based upon and/or assume:

1. Rankine earth pressure theory;
2. Retaining wall backfilled with *Clean Granular Fill* (Table 1);
3. Unit weight of backfill less than 135 pcf;
4. No hydrostatic pressures;
5. Surcharge loading; The proposed basement wall should be designed to support the surcharge loading from the proposed building. Parking areas and roadway will be proximally located to the proposed foundation walls, and where applicable, the walls should be designed with a minimum surcharge load of 250 psf in accordance with the *AASHTO Standard Specification for Highway Bridges*;
6. A level backfill in front and behind of wall;
7. Dynamic/compaction stresses limited to 200 psf/foot;
8. The top 2 feet of soils in front of exterior retaining walls should not be considered for passive resistance;
9. Seismic loading shall be applied as required by the *IBC*;
10. Use of only small plate compactors within 3 feet of the top of wall.

The lateral resistance of retaining walls should also accommodate any surcharge loads. Uniformly distributed loads should be superimposed along the face of the wall at a magnitude equal to the surcharge pressure multiplied by the appropriate earth pressure coefficient. Surcharge loads should be considered where they are located within a horizontal distance equivalent to 1 times the height of the wall. Any anticipated point or line loads situated behind the wall should be evaluated in accordance with linear elastic theory.

For frost protection and proper drainage, it is recommended that *Clean Granular Fill* be placed



directly behind unbalanced walls. The ground surface immediately adjacent to the unbalanced wall should be sloped away from the building to allow for positive drainage. It is also recommended that the final surface materials adjacent to the wall be relatively impermeable to reduce the volume of precipitation infiltrating into the subgrade. Such impermeable materials include cement concrete, bituminous concrete, and/or vegetated silty/clayey topsoil.

Retaining walls (including basement walls) should be provided with adequate footing drains per the International Building Code. The perimeter foundation drain should be located at least 4 inches above the bottom of footing elevation and six inches outward from the edge of footing. The drains should not encroach within the Footing Zone of Influence, which is defined as that area extending laterally one foot from the edge of footing then outward and downward at a 1H:1.5V splay. Furthermore, the invert elevation of the drain should be at least 12 inches below the underside of the adjacent floor slab. The drains should consist of minimum 4-inch diameter perforated PVC-SDR 35 drain pipe encased within 12 inches of  $\frac{3}{4}$ -inch stone and wrapped with a filter fabric such as Mirafi 140N or equal. If unbalanced walls cannot be drained to alleviate hydrostatic forces, then the lateral earth pressure should be increased to include full hydrostatic pressures.

Any footing and under-slab drains may discharge via gravity to a storm drain line not subject to surcharge. The Civil Engineer should review the discharge of the drains. The drains should be provided with permanent clean-outs at convenient locations to facilitate access to all sections of the system. Roof gutters and other storm collection should not be discharged to the footing/under-slab drains. Any recharge systems, infiltrators, and/or dry wells shall be kept away from the unbalanced/retaining walls to prevent hydrostatic surcharge.

The following interface friction angle(s),  $\phi$ , and associated friction factors ( $=\tan \phi$ ) are recommended for sliding resistance/overturning:

| Condition                                            | Interface Friction Angle | Friction Factor |
|------------------------------------------------------|--------------------------|-----------------|
| Mass concrete (base of wall) on crushed gravel/stone | 30                       | 0.57            |
| Mass concrete (base of wall) on Glacial Deposits     | 22                       | 0.40            |
| Formed concrete (wall) against Clean Granular Fill   | 22                       | 0.40            |

## **APPENDIX D: CONCEPT PLAN & EXPLORATION LOCATION PLAN**



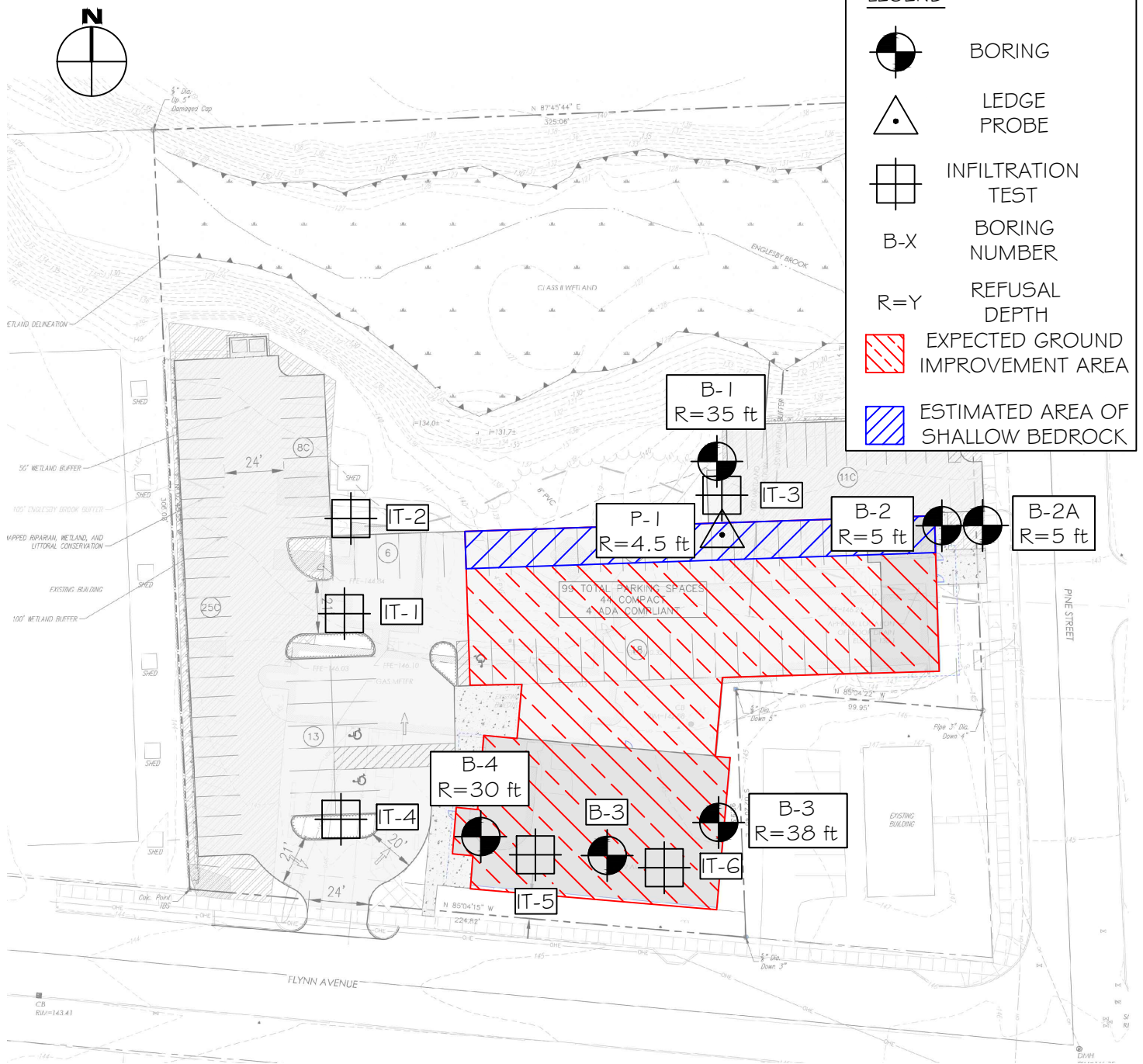


-  AREAS TO BE RE-GRADED AND PAVED, APPLY MARKINGS AS SHOWN, TYP., INCLUSIVE OF MIRAFI 500X GEOTEXTILE, 18" COARSE CRUSHED GRAVEL & 6" FINE CRUSHED GRAVEL
-  4" THICK CONCRETE SIDEWALK, TYP., INCLUSIVE OF MIRAFI 500X GEOTEXTILE, 24" COARSE CRUSHED GRAVEL & 6" FINE CRUSHED GRAVEL
-  CONNECT 2" TYPE "K" COPPER WATER SERVICE LINE FROM EX. PIPE TO PROP. BLDG, INCLUSIVE OF GATE VALVE PER BURLINGTON DPW STANDARD
-  ADD ALT. - WET TAP AT MAIN IN FLYNN AVE., 6" D.I. SERVICE LINE TO PROP. BLDG. & GATE VALVE PER BURLINGTON DPW STANDARD
-  CONNECT 6" PVC SANITARY SEWER SERVICE LINE FROM PROP. BLDG. TO EX. MAIN IN FLYNN AVE., INCLUSIVE OF CLEANOUT WITH BACKFLOW PREVENTER AS SHOWN
-  WOOD GUIDERAIL, TYP.
-  PRECAST CONCRETE BLOCK RETAINING WALL, MAX. HEIGHT 5'
-  BOULDER OR PRECAST CONCRETE BLOCK RETAINING WALL, MAX. HEIGHT 3'
-  FOCAL POINT STORMWATER TREATMENT SYSTEM INCLUDING RAIN GUARDIAN TURRET & NYLOPLAST OUTLET DRAIN, TYP.
  - A. 25 SF TREATMENT AREA AT EL. 143.0
  - B. 75 SF TREATMENT AREA AT EL. 142.0
  - C. 75 SF TREATMENT AREA AT EL. 142.0
  - D. 275 SF TREATMENT AREA AT EL. 144.0

- C9** (143) ADS SC-310 STORMTECH CHAMBERS BELOW PARKING
- C10** 18" HDPE OUTLET PIPE FROM C9 INCLUDING FLARED END SECTION
- C11** 4' I.D. MANHOLE PROVIDING CONNECTION FROM C8A TO C9
- C12** CONCRETE PAD SURROUNDED BY PRIVACY FENCE WITH LOCKING GATE SIZED FOR (2) REFUSE DUMPSTERS
- C13** TRANSFORMER ON CONCRETE PAD SURROUNDED BY BOLLARDS, COORDINATE WITH MEP
- C14** 6" PERF. PVC FOOTING DRAIN AROUND BASEMENT LEVEL, DISCHARGE TO DAYLIGHT
- C14A** ADD ALT. - 6" PERF. FOOTING DRAIN AROUND FIRST FLOOR LEVEL, DISCHARGE TO DAYLIGHT
- C15** ELECTRIC VEHICLE CHARGING STATION WITH (2) CHARGE PORTS

[illegible]





|                 |                                           |
|-----------------|-------------------------------------------|
| DATE: 02/06/23  | DRAWING NAME:                             |
| JOB # 22-04-138 | EXPLORATION LOCATION PLAN                 |
| DRAFT: TM       | PROJECT: HOWARD HEALTH CENTER RENOVATIONS |
| DESIGN: QG      | BURLINGTON, VERMONT                       |
| REVIEW: SL      | CLIENT: HOWARD HEALTH CENTER              |
| REVISIONS:      | BURLINGTON, VERMONT                       |



DRAWING #:  
1

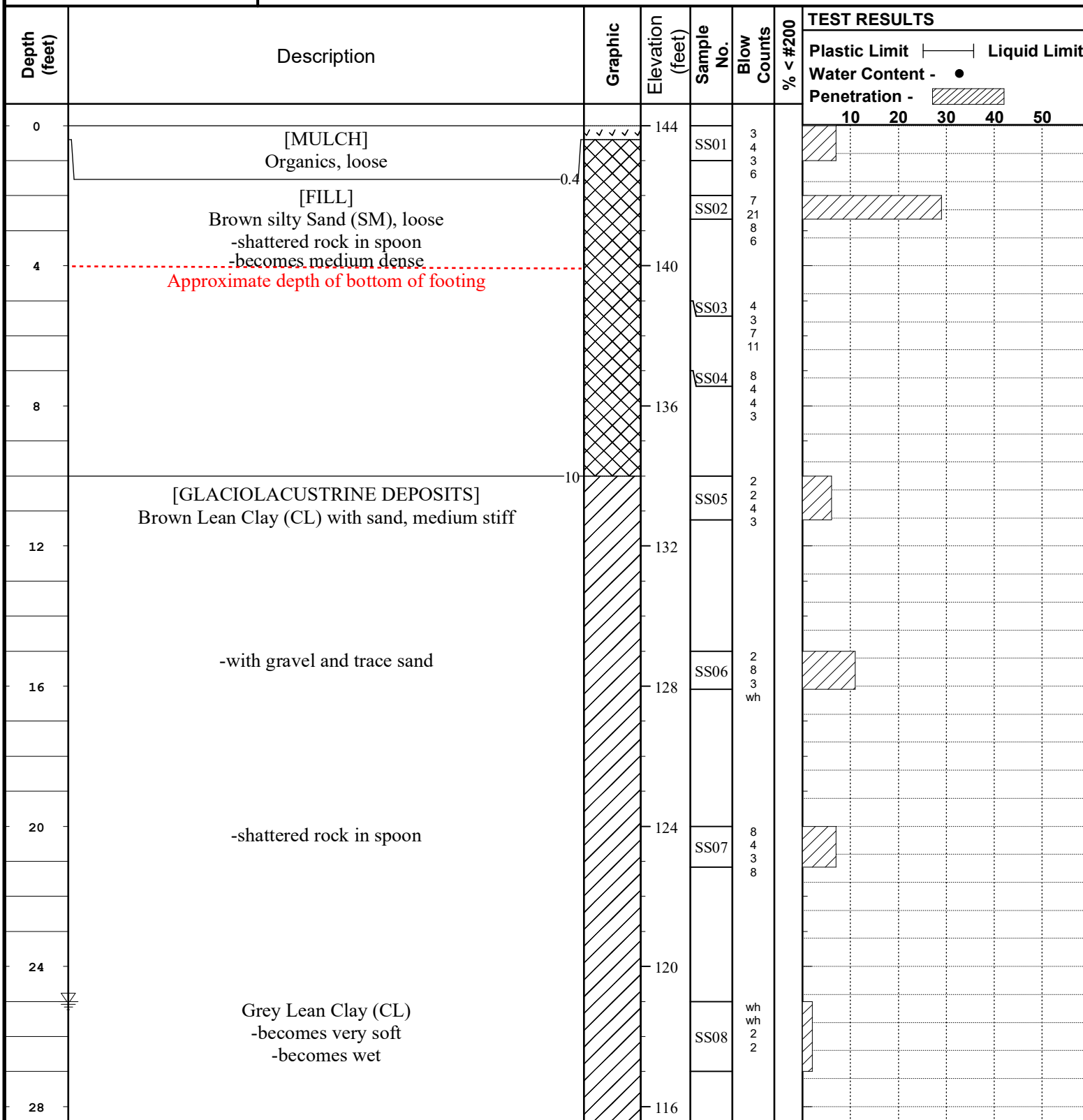
## APPENDIX E: EXPLORATION LOGS & KEY TO SYMBOLS AND DESCRIPTIONS



# LOG OF BORING No. B-1

PROJECT: Howard Center Redevelopment Project PROJECT NO.: 22-04-138  
CLIENT: Howard Center  
PROJECT LOCATION: 300 Flynn Avenue, Burlington, Vermont  
LOCATION: Howard Center ELEVATION: 144  
DRILLER: Soil-X LOGGED BY: Q. Guglielmo  
DRILLING METHOD: B-57 Truck Mounted Drilling Rig DATE: 12/12/22 & 12/13/22  
DEPTH TO - WATER> INITIAL: 25 AFTER 24 HOURS: 25

This information pertains only to this boring and should not be interpreted as being indicative of the site.







# LOG OF BORING No. B-1

PROJECT: Howard Center Redevelopment Project PROJECT NO.: 22-04-138  
CLIENT: Howard Center  
PROJECT LOCATION: 300 Flynn Avenue, Burlington, Vermont  
LOCATION: Howard Center ELEVATION: 144  
DRILLER: Soil-X LOGGED BY: Q. Guglielmo  
DRILLING METHOD: B-57 Truck Mounted Drilling Rig DATE: 12/12/22 & 12/13/22  
DEPTH TO - WATER> INITIAL: 25 AFTER 24 HOURS: 25

This information pertains only to this boring and should not be interpreted as being indicative of the site.

| Depth<br>(feet) | Description                                  | Graphic | Elevation<br>(feet) | Sample<br>No. | Blow<br>Counts       | % < #200 | TEST RESULTS  |   |              |               |             |
|-----------------|----------------------------------------------|---------|---------------------|---------------|----------------------|----------|---------------|---|--------------|---------------|-------------|
|                 |                                              |         |                     |               |                      |          | Plastic Limit | — | Liquid Limit | Water Content | Penetration |
|                 |                                              |         |                     |               |                      |          |               |   |              |               |             |
| 32              |                                              |         | 112                 | SS09          | wh<br>wh<br>wh<br>18 |          |               |   |              |               |             |
| 36              | Auger Refusal<br>Boring terminated at 35 ft. |         | 108                 | SS10          | 25/0<br>-<br>-       |          |               |   |              |               |             |
| 40              |                                              |         | 104                 |               |                      |          |               |   |              |               |             |
| 44              |                                              |         | 100                 |               |                      |          |               |   |              |               |             |
| 48              |                                              |         | 96                  |               |                      |          |               |   |              |               |             |
| 52              |                                              |         | 92                  |               |                      |          |               |   |              |               |             |
| 56              |                                              |         | 88                  |               |                      |          |               |   |              |               |             |



# LOG OF BORING No. B-2

PROJECT: Howard Center Redevelopment Project PROJECT NO.: 22-04-138  
CLIENT: Howard Center  
PROJECT LOCATION: 300 Flynn Avenue, Burlington, Vermont  
LOCATION: Howard Center ELEVATION: 144  
DRILLER: Soil-X LOGGED BY: Q. Guglielmo  
DRILLING METHOD: B-57 Truck Mounted Drilling Rig DATE: 12/12/22 & 12/13/22  
DEPTH TO - WATER> INITIAL: ≅ AFTER 24 HOURS: ≅

This information pertains only to this boring and should not be interpreted as being indicative of the site.

| Depth<br>(feet) | Description                                                                         | Graphic | Elevation<br>(feet) | Sample<br>No. | Blow<br>Counts   | % < #200 | TEST RESULTS  |   |              |               |             |
|-----------------|-------------------------------------------------------------------------------------|---------|---------------------|---------------|------------------|----------|---------------|---|--------------|---------------|-------------|
|                 |                                                                                     |         |                     |               |                  |          | Plastic Limit | — | Liquid Limit | Water Content | Penetration |
| 0               | [TOPSOIL]<br>Dark brown silty Sand (SM) with organics, loose                        |         | 144                 | SS01          | 2<br>2<br>3<br>4 |          |               |   |              |               |             |
|                 | [GLACIOLACUSTRINE DEPOSITS] Brown Lean Clay (CL),<br>medium stiff<br>-becomes stiff |         |                     |               | 2<br>7<br>6<br>8 |          |               |   |              |               |             |
| 4               | Approximate depth of bottom of footing                                              |         | 140                 |               |                  |          |               |   |              |               |             |
|                 | Auger Refusal<br>Boring terminated at 5 ft.                                         |         |                     | SS03          | 25/0             |          |               |   |              |               |             |
| 8               |                                                                                     |         | 136                 |               |                  |          |               |   |              |               |             |
| 12              |                                                                                     |         | 132                 |               |                  |          |               |   |              |               |             |
| 16              |                                                                                     |         | 128                 |               |                  |          |               |   |              |               |             |
| 20              |                                                                                     |         | 124                 |               |                  |          |               |   |              |               |             |
| 24              |                                                                                     |         | 120                 |               |                  |          |               |   |              |               |             |
| 28              |                                                                                     |         | 116                 |               |                  |          |               |   |              |               |             |



# LOG OF BORING No. B-2A

PROJECT: Howard Center Redevelopment Project PROJECT NO.: 22-04-138  
CLIENT: Howard Center  
PROJECT LOCATION: 300 Flynn Avenue, Burlington, Vermont  
LOCATION: Howard Center ELEVATION: 144  
DRILLER: Soil-X LOGGED BY: Q. Guglielmo  
DRILLING METHOD: B-57 Truck Mounted Drilling Rig DATE: 12/12/22 & 12/13/22  
DEPTH TO - WATER> INITIAL: ≡ AFTER 24 HOURS: ≡

This information pertains only to this boring and should not be interpreted as being indicative of the site.

| Depth<br>(feet) | Description                | Graphic | Elevation<br>(feet) | Sample<br>No. | Blow<br>Counts | % < #200 | TEST RESULTS  |              |  |                   |                                                                                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|                 |                            |         |                     |               |                |          | Plastic Limit | Liquid Limit |  | Water Content - ● | Penetration -  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|                 |                            |         |                     |               |                |          |               |              |  |                   |                                                                                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 10              | 20                         | 30      | 40                  | 50            |                |          |               |              |  |                   |                                                                                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 0               | Augered directly to 5 feet |         | 144                 |               |                |          |               |              |  |                   |                                                                                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

7 feet east of B-2

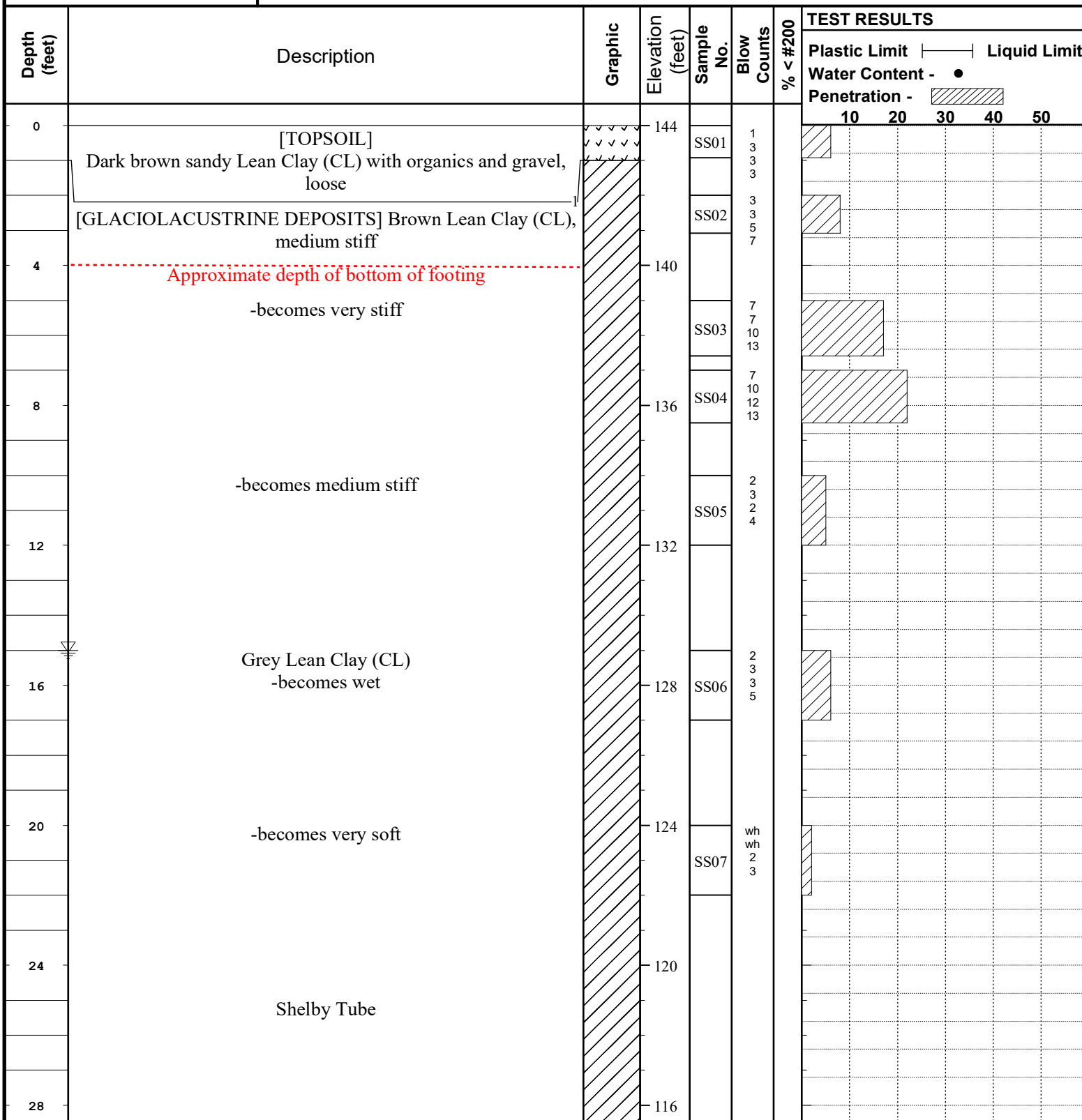




# LOG OF BORING No. B-3

PROJECT: Howard Center Redevelopment Project PROJECT NO.: 22-04-138  
CLIENT: Howard Center  
PROJECT LOCATION: 300 Flynn Avenue, Burlington, Vermont  
LOCATION: Howard Center ELEVATION: 144  
DRILLER: Soil-X LOGGED BY: Q. Guglielmo  
DRILLING METHOD: B-57 Truck Mounted Drilling Rig DATE: 12/12/22 & 12/13/22  
DEPTH TO - WATER> INITIAL: 15 AFTER 24 HOURS: 15

This information pertains only to this boring and should not be interpreted as being indicative of the site.

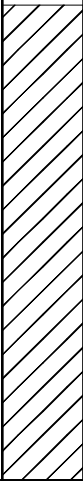




# LOG OF BORING No. B-3

PROJECT: Howard Center Redevelopment Project PROJECT NO.: 22-04-138  
CLIENT: Howard Center  
PROJECT LOCATION: 300 Flynn Avenue, Burlington, Vermont  
LOCATION: Howard Center ELEVATION: 144  
DRILLER: Soil-X LOGGED BY: Q. Guglielmo  
DRILLING METHOD: B-57 Truck Mounted Drilling Rig DATE: 12/12/22 & 12/13/22  
DEPTH TO - WATER> INITIAL: 15 AFTER 24 HOURS: 15

This information pertains only to this boring and should not be interpreted as being indicative of the site.

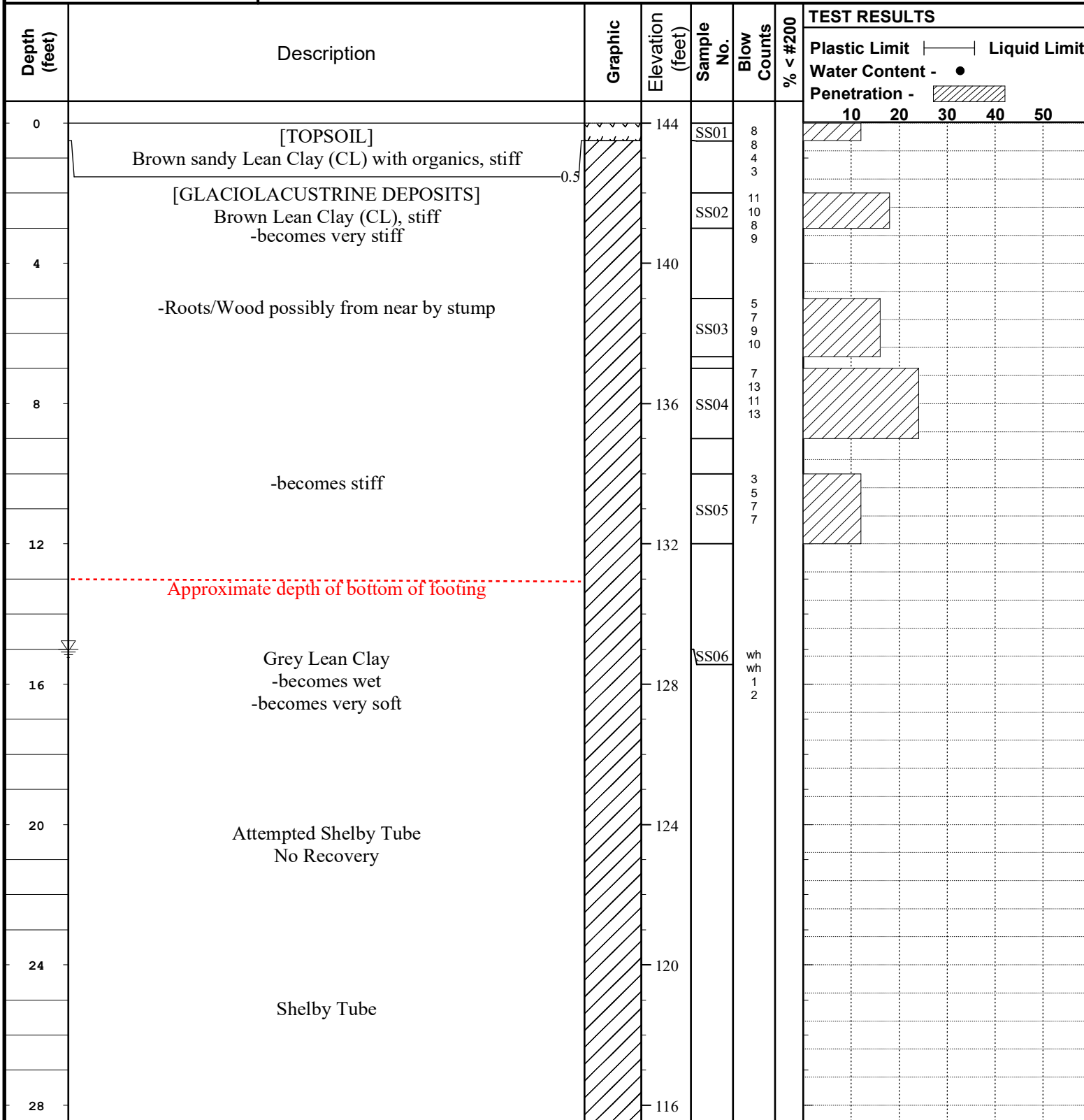
| Depth<br>(feet) | Description                                  | Graphic                                                                            | Elevation<br>(feet) | Sample<br>No. | Blow<br>Counts      | % < #200 | TEST RESULTS  |              |    |               |    |
|-----------------|----------------------------------------------|------------------------------------------------------------------------------------|---------------------|---------------|---------------------|----------|---------------|--------------|----|---------------|----|
|                 |                                              |                                                                                    |                     |               |                     |          | Plastic Limit | Liquid Limit |    | Water Content |    |
|                 |                                              |                                                                                    |                     |               |                     |          | Penetration - |              |    |               |    |
|                 |                                              |                                                                                    |                     |               |                     |          | 10            | 20           | 30 | 40            | 50 |
|                 |                                              |   |                     |               | wh<br>wh<br>wh<br>3 |          |               |              |    |               |    |
| 32              |                                              |                                                                                    | 112                 | SS08          |                     |          |               |              |    |               |    |
|                 |                                              |                                                                                    |                     |               |                     |          |               |              |    |               |    |
| 36              |                                              |                                                                                    | 108                 |               |                     |          |               |              |    |               |    |
|                 | Auger Refusal<br>Boring terminated at 38 ft. |  |                     | SS09          | 25/0                |          |               |              |    |               |    |
| 40              |                                              |                                                                                    | 104                 |               |                     |          |               |              |    |               |    |
|                 |                                              |                                                                                    |                     |               |                     |          |               |              |    |               |    |
| 44              |                                              |                                                                                    | 100                 |               |                     |          |               |              |    |               |    |
|                 |                                              |                                                                                    |                     |               |                     |          |               |              |    |               |    |
| 48              |                                              |                                                                                    | 96                  |               |                     |          |               |              |    |               |    |
|                 |                                              |                                                                                    |                     |               |                     |          |               |              |    |               |    |
| 52              |                                              |                                                                                    | 92                  |               |                     |          |               |              |    |               |    |
|                 |                                              |                                                                                    |                     |               |                     |          |               |              |    |               |    |
| 56              |                                              |                                                                                    | 88                  |               |                     |          |               |              |    |               |    |



# LOG OF BORING No. B-4

PROJECT: Howard Center Redevelopment Project PROJECT NO.: 22-04-138  
CLIENT: Howard Center  
PROJECT LOCATION: 300 Flynn Avenue, Burlington, Vermont  
LOCATION: Howard Center ELEVATION: 144  
DRILLER: Soil-X LOGGED BY: Q. Guglielmo  
DRILLING METHOD: B-57 Truck Mounted Drilling Rig DATE: 12/12/22 & 12/13/22  
DEPTH TO - WATER> INITIAL: 15 AFTER 24 HOURS: 15

This information pertains only to this boring and should not be interpreted as being indicative of the site.





|                                                                       |  |                                             |  |
|-----------------------------------------------------------------------|--|---------------------------------------------|--|
| <b>PROJECT:</b> <u>Howard Center Redevelopment Project</u>            |  | <b>PROJECT NO.:</b> <u>22-04-138</u>        |  |
| <b>CLIENT:</b> <u>Howard Center</u>                                   |  |                                             |  |
| <b>PROJECT LOCATION:</b> <u>300 Flynn Avenue, Burlington, Vermont</u> |  |                                             |  |
| <b>LOCATION:</b> <u>Howard Center</u>                                 |  | <b>ELEVATION:</b> <u>144</u>                |  |
| <b>DRILLER:</b> <u>Soil-X</u>                                         |  | <b>LOGGED BY:</b> <u>Q. Guglielmo</u>       |  |
| <b>DRILLING METHOD:</b> <u>B-57 Truck Mounted Drilling Rig</u>        |  | <b>DATE:</b> <u>12/12/22 &amp; 12/13/22</u> |  |
| <b>DEPTH TO - WATER&gt; INITIAL:</b> <u>15</u>                        |  | <b>AFTER 24 HOURS:</b> <u>15</u>            |  |

| Depth<br>(feet) | Description                                  | Graphic | Elevation<br>(feet) | Sample<br>No. | Blow<br>Counts | % < #200 | TEST RESULTS  |                 |              |               |  |
|-----------------|----------------------------------------------|---------|---------------------|---------------|----------------|----------|---------------|-----------------|--------------|---------------|--|
|                 |                                              |         |                     |               |                |          | Plastic Limit | Water Content - | Liquid Limit | Penetration - |  |
|                 |                                              |         |                     |               |                |          |               |                 |              |               |  |
|                 | Auger Refusal<br>Boring terminated at 30 ft. |         |                     | SS07          | 25/0           |          |               |                 |              |               |  |
| 32              |                                              |         | 112                 |               |                |          |               |                 |              |               |  |
| 36              |                                              |         | 108                 |               |                |          |               |                 |              |               |  |
| 40              |                                              |         | 104                 |               |                |          |               |                 |              |               |  |
| 44              |                                              |         | 100                 |               |                |          |               |                 |              |               |  |
| 48              |                                              |         | 96                  |               |                |          |               |                 |              |               |  |
| 52              |                                              |         | 92                  |               |                |          |               |                 |              |               |  |
| 56              |                                              |         | 88                  |               |                |          |               |                 |              |               |  |

**This information pertains only to this boring and should not be interpreted as being indicative of the site.**

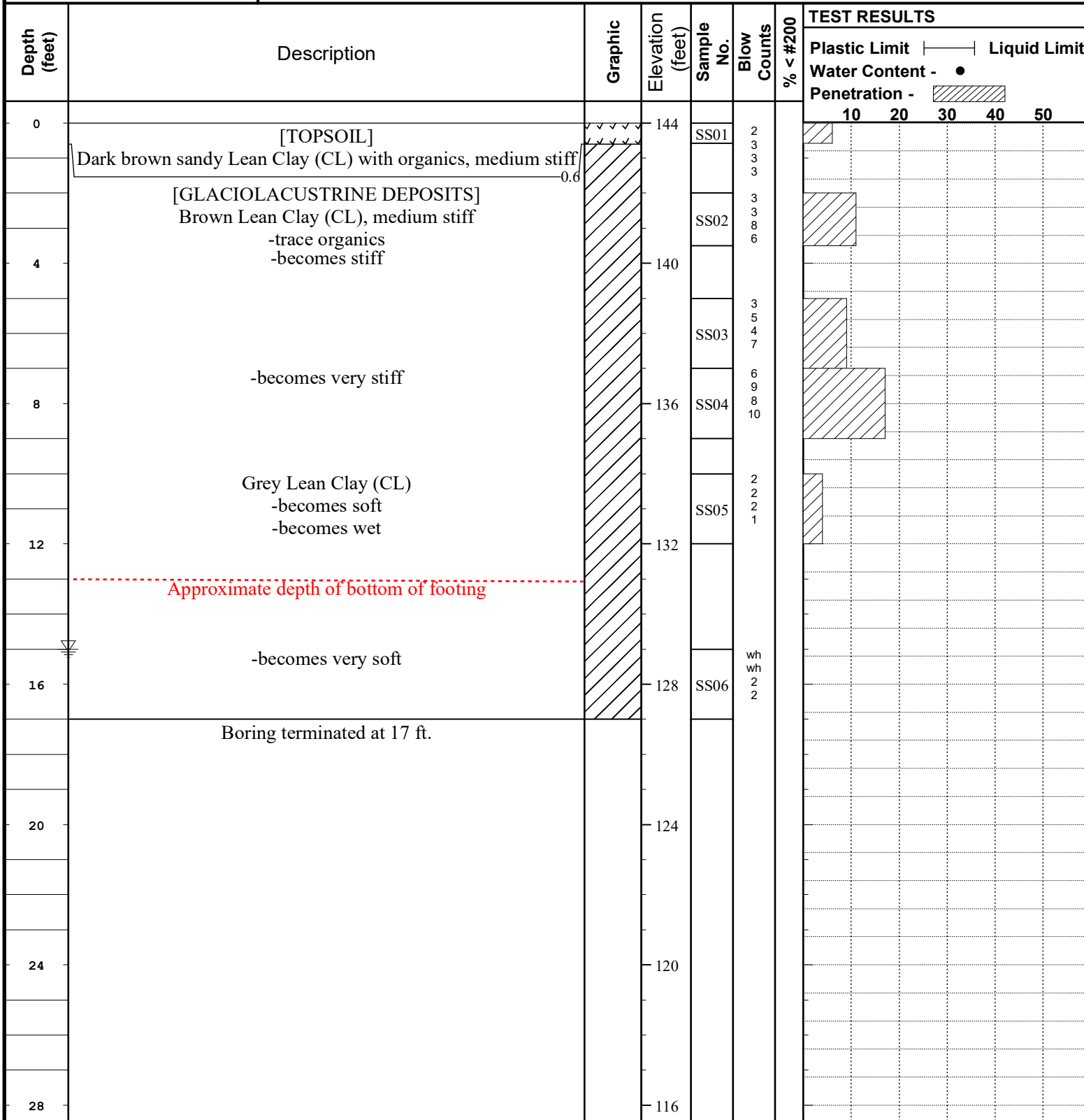




# LOG OF BORING No. B-5

PROJECT: Howard Center Redevelopment Project PROJECT NO.: 22-04-138  
CLIENT: Howard Center  
PROJECT LOCATION: 300 Flynn Avenue, Burlington, Vermont  
LOCATION: Howard Center ELEVATION: 144  
DRILLER: Soil-X LOGGED BY: Q. Guglielmo  
DRILLING METHOD: B-57 Truck Mounted Drilling Rig DATE: 12/12/22 & 12/13/22  
DEPTH TO - WATER> INITIAL: 15 AFTER 24 HOURS: 15

This information pertains only to this boring and should not be interpreted as being indicative of the site.





# LOG OF BORING No. P-1

PROJECT: Howard Center Redevelopment Project PROJECT NO.: 22-04-138  
CLIENT: Howard Center  
PROJECT LOCATION: 300 Flynn Avenue, Burlington, Vermont  
LOCATION: Howard Center ELEVATION: 144  
DRILLER: Soil-X LOGGED BY: Q. Guglielmo  
DRILLING METHOD: B-57 Truck Mounted Drilling Rig DATE: 12/12/22 & 12/13/22  
DEPTH TO - WATER> INITIAL: ≡ AFTER 24 HOURS: ≡

This information pertains only to this boring and should not be interpreted as being indicative of the site.

| Depth<br>(feet) | Description                                                                             | Graphic                                                                           | Elevation<br>(feet) | Sample<br>No. | Blow<br>Counts | % < #200 | TEST RESULTS  |    |                                                                                     |               |    |
|-----------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------|---------------|----------------|----------|---------------|----|-------------------------------------------------------------------------------------|---------------|----|
|                 |                                                                                         |                                                                                   |                     |               |                |          | Plastic Limit | —  | Liquid Limit                                                                        | Water Content | •  |
|                 |                                                                                         |                                                                                   |                     |               |                |          | Penetration   | -  |  |               |    |
| 0               | Augered directly to 4.5 feet                                                            |                                                                                   | 144                 |               |                |          | 10            | 20 | 30                                                                                  | 40            | 50 |
| 4               | Approximate depth of bottom of footing<br>Auger Refusal<br>Boring terminated at 4.5 ft. |  | 140                 |               |                |          |               |    |                                                                                     |               |    |
| 8               |                                                                                         |                                                                                   | 136                 |               |                |          |               |    |                                                                                     |               |    |
| 12              |                                                                                         |                                                                                   | 132                 |               |                |          |               |    |                                                                                     |               |    |
| 16              |                                                                                         |                                                                                   | 128                 |               |                |          |               |    |                                                                                     |               |    |
| 20              |                                                                                         |                                                                                   | 124                 |               |                |          |               |    |                                                                                     |               |    |
| 24              |                                                                                         |                                                                                   | 120                 |               |                |          |               |    |                                                                                     |               |    |
| 28              |                                                                                         |                                                                                   | 116                 |               |                |          |               |    |                                                                                     |               |    |

| MAJOR DIVISIONS                                      |                                                    |                                       | SYMBOLS |  | TYPICAL NAMES                                                                                                      |  |
|------------------------------------------------------|----------------------------------------------------|---------------------------------------|---------|--|--------------------------------------------------------------------------------------------------------------------|--|
| COARSE-GRAINED SOILS<br>OVER 50% > No.200 SIEVE SIZE | GRAVELS                                            | CLEAN GRAVELS WITH LESS THAN 5% FINES | GW      |  | Well-graded gravels or gravel-sand mixtures, little or no fines                                                    |  |
|                                                      |                                                    |                                       | GP      |  | Poorly graded gravels or gravel-sand mixtures, little or no fines                                                  |  |
|                                                      |                                                    | GRAVELS WITH OVER 15% FINES           | GM      |  | Silty gravels, gravel-sand mixtures                                                                                |  |
|                                                      |                                                    |                                       | GC      |  | Clayey gravels, gravel-sand-clay mixtures                                                                          |  |
|                                                      | SANDS                                              | CLEAN SANDS WITH LESS THAN 5% FINES   | SW      |  | Well-graded sand or gravelly sands, little or no fines                                                             |  |
|                                                      |                                                    |                                       | SP      |  | Poorly graded sands or gravelly sands, little or no fines                                                          |  |
|                                                      |                                                    | SANDS WITH OVER 15% FINES             | SM      |  | Silty sand, sand-silt mixtures                                                                                     |  |
|                                                      |                                                    |                                       | SC      |  | Clayey sands, sand-clay mixtures                                                                                   |  |
| FINE-GRAINED SOILS<br>OVER 50% < No.200 SIEVE SIZE   | SILTS & CLAYS<br><br>LIQUID LIMIT 50% OR LESS      |                                       | ML      |  | Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity |  |
|                                                      |                                                    |                                       | CL      |  | Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays                  |  |
|                                                      |                                                    |                                       | OL      |  | Organic silts and organic silty clays of low plasticity                                                            |  |
|                                                      | SILTS & CLAYS<br><br>LIQUID LIMIT GREATER THAN 50% |                                       | MH      |  | Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts                                |  |
|                                                      |                                                    |                                       | CH      |  | Inorganic clays of high plasticity, fat clays                                                                      |  |
|                                                      |                                                    |                                       | OH      |  | Organic clays of medium to high plasticity, organic silty clays, organic silts                                     |  |
|                                                      | HIGHLY ORGANIC SOILS                               |                                       | PT      |  | Peat and other highly organic soils                                                                                |  |

KEY TO SYMBOLS AND DESCRIPTIONS

|  |                                      |  |                                 |
|--|--------------------------------------|--|---------------------------------|
|  | Shelby Tube                          |  | Auger Cuttings                  |
|  | Standard Split Spoon Sample          |  | 3" Split Spoon Sample           |
|  | Rock Core                            |  | Dynamic Cone Penetrometer       |
|  | Vane Shear                           |  | Bulk/Grab Sample                |
|  | Geoprobe Sample                      |  | Sonic or Vibro-Core Sample      |
|  | Water Table<br>(at time of drilling) |  | Water Table<br>(after 24 hours) |

TYPICAL SYMBOLS

SOIL MOISTURE MODIFIERS

| Term  | Description                              |
|-------|------------------------------------------|
| Dry   | Absence of moisture; dusty, dry to touch |
| Moist | Damp but no visible water                |
| Wet   | Visible free water                       |

The descriptor "damp" should not be used (use "moist").  
The descriptor "saturated" should not be used (use "wet").

|  |                                 |
|--|---------------------------------|
|  | Recessed Cover Set in Concrete  |
|  | Top of Well, Recessed Pipe      |
|  | Covered Riser                   |
|  | Capped Riser w/ Locking Cover   |
|  | Pipe Riser                      |
|  | Concrete Seal                   |
|  | Gravel Backfill                 |
|  | Assorted Cuttings               |
|  | Bentonite Slurry                |
|  | Bentonite Pellets               |
|  | Silica Sand, blank PVC          |
|  | Slotted Pipe w/ Sand            |
|  | Endcap on Pipe Packed in Sand   |
|  | Silica Sand, No Pipe (End Plug) |

WELL SYMBOLS

## KEY TO SYMBOLS AND DESCRIPTIONS

|                                                                                     |                                      |                                                                                                                            |                                 |                                                                                       |                                 |
|-------------------------------------------------------------------------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
|  | Shelby Tube                          |                                         | Auger Cuttings                  |    | Recessed Cover                  |
|  | Standard Split Spoon Sample          |  | 3" Split Spoon Sample           |    | Set in Concrete                 |
|  | Rock Core                            |                                         | Dynamic Cone Penetrometer       |    | Top of Well                     |
|  | Vane Shear                           |                                         | Bulk/Grab Sample                |    | Recessed Pipe                   |
|  | Geoprobe Sample                      |                                         | Sonic or Vibro-Core Sample      |    | Covered Riser                   |
|  | Water Table<br>(at time of drilling) |                                         | Water Table<br>(after 24 hours) |    | Capped Riser w/ Locking Cover   |
|                                                                                     |                                      |                                                                                                                            |                                 |    | Pipe Riser                      |
|                                                                                     |                                      |                                                                                                                            |                                 |    | Concrete Seal                   |
|                                                                                     |                                      |                                                                                                                            |                                 |    | Gravel Backfill                 |
|                                                                                     |                                      |                                                                                                                            |                                 |   | Assorted Cuttings               |
|                                                                                     |                                      |                                                                                                                            |                                 |  | Bentonite Slurry                |
|                                                                                     |                                      |                                                                                                                            |                                 |  | Bentonite Pellets               |
|                                                                                     |                                      |                                                                                                                            |                                 |  | Silica Sand, blank PVC          |
|                                                                                     |                                      |                                                                                                                            |                                 |  | Slotted Pipe w/ Sand            |
|                                                                                     |                                      |                                                                                                                            |                                 |  | Endcap on Pipe Packed in Sand   |
|                                                                                     |                                      |                                                                                                                            |                                 |  | Silica Sand, No Pipe (End Plug) |

## TYPICAL SYMBOLS

## SOIL MOISTURE MODIFIERS

| Term  | Description                              |
|-------|------------------------------------------|
| Dry   | Absence of moisture; dusty, dry to touch |
| Moist | Damp but no visible water                |
| Wet   | Visible free water                       |

The descriptor "damp" should not be used (use "moist").  
The descriptor "saturated" should not be used (use "wet").

## WELL SYMBOLS

| CLASSIFICATION                   | RANGE OF GRAIN SIZES                                                         |                                                                  | RELATIVE DENSITY/CONSISTENCY                                                                                                   |                  |                         |             |              | PERCENT OR PORTIONS OF SOIL |                                                                       |
|----------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------|-------------|--------------|-----------------------------|-----------------------------------------------------------------------|
|                                  | U.S. Standard Sieve Size                                                     | Grain Size in Millimeters                                        | Gravel, Sand, and Silt (nonplastic)                                                                                            |                  | Silt (plastic) and Clay |             |              | Term                        | Description                                                           |
| BOULDERS                         | Above 12"                                                                    | Above 305                                                        | N-Value                                                                                                                        | Relative Density | N-Value                 | Su          | Consistency  | Parting:                    | > 1/16 in.                                                            |
| COBBLES                          | 12" to 3"                                                                    | 305 to 76.2                                                      | 0 - 4                                                                                                                          | Very Loose       | 0 - 2                   | 0 - 250     | Very Soft    | Seam:                       | 0.5 in. to 1/16 in.                                                   |
| GRAVEL<br>coarse<br>fine         | 3" to No. 4<br>3" to 3/4"<br>3/4" to No. 4                                   | 76.2 to 4.75<br>76.2 to 19.1<br>19.1 to 4.75                     | 5 - 10                                                                                                                         | Loose            | 3 - 4                   | 251 - 500   | Soft         | Layer:                      | 12 in. to 0.5 in.                                                     |
|                                  |                                                                              |                                                                  | 11-30                                                                                                                          | Medium Dense     | 5 - 8                   | 501 - 1000  | Medium Stiff | Stratum:                    | > 12 in.                                                              |
|                                  |                                                                              |                                                                  | 31 - 50                                                                                                                        | Dense            | 9 - 15                  | 1001 - 2000 | Stiff        | Pocket:                     | Small erratic deposit                                                 |
| SAND<br>coarse<br>medium<br>fine | No. 4 to No. 200<br>No. 4 to No. 10<br>No. 10 to No. 40<br>No. 40 to No. 200 | 4.75 to 0.075<br>4.75 to 2.00<br>2.00 to 0.425<br>0.425 to 0.075 | 51 +                                                                                                                           | Very Dense       | 16 - 30                 | 2001 - 4000 | Very Stiff   | Lens:                       | Lenticular deposit                                                    |
|                                  |                                                                              |                                                                  |                                                                                                                                |                  | 31 +                    | 4001+       | Hard         | Occasional:                 | One or less per foot of thickness                                     |
|                                  |                                                                              |                                                                  | Standard Penetration Testing (SPT) N <sub>60</sub> based on blows per 12 inches.<br>WR = Weight of Rods; WH = Weight of Hammer |                  |                         |             |              | Frequent                    | More than one per foot of thickness                                   |
| SILT & CLAY                      | Below No. 200                                                                | Below 0.075                                                      |                                                                                                                                |                  |                         |             |              | Varved                      | Alternating seams or layers of silt and/or clay and sometimes f. sand |

**REFERENCE: UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D2488-93**

## INFILTRATION TEST LOGS

|                                     |                                                        |
|-------------------------------------|--------------------------------------------------------|
| <b>John Turner Consulting, Inc.</b> | <b>Site Location: 300 Flynn Avenue, Burlington, VT</b> |
|-------------------------------------|--------------------------------------------------------|

| IT-1    | Depth to Water (in) |        |        |        | Depth to Gravel (in): 57 |                   |
|---------|---------------------|--------|--------|--------|--------------------------|-------------------|
|         | 15 min              | 30 min | 45 min | 60 min | Total Drop (in)          | Drop/Hour (in/hr) |
| Trial 1 | 45                  | 50     | 55     | 57     | 12                       | 12                |
| Trial 2 | 45                  | 48     | 50     | 53     | 8                        | 8                 |
| Trial 3 | 40                  | 44     | 49     | 51     | 11                       | 11                |
| Trial 4 | 40                  | 44     | 48     | 50     | 10                       | 10                |

| IT-2    | Depth to Water (in) |        |        |        | Depth to Gravel (in): 49 |                   |
|---------|---------------------|--------|--------|--------|--------------------------|-------------------|
|         | 15 min              | 30 min | 45 min | 60 min | Total Drop (in)          | Drop/Hour (in/hr) |
| Trial 1 | 28                  | 28     | 28     | 28     | 0                        | 0                 |
| Trial 2 | 28                  | 28     | 28     | 28     | 0                        | 0                 |
| Trial 3 | 28                  | 28     | 28     | 28     | 0                        | 0                 |
| Trial 4 | 28                  | 28     | 28     | 28     | 0                        | 0                 |

| IT-3    | Depth to Water (in) |        |        |        | Depth to Gravel (in): 56 |                   |
|---------|---------------------|--------|--------|--------|--------------------------|-------------------|
|         | 15 min              | 30 min | 45 min | 60 min | Total Drop (in)          | Drop/Hour (in/hr) |
| Trial 1 | 36                  | 36     | 36     | 36     | 0                        | 0                 |
| Trial 2 | 36                  | 36     | 36     | 36     | 0                        | 0                 |
| Trial 3 | 36                  | 36     | 36     | 36     | 0                        | 0                 |
| Trial 4 | 36                  | 36     | 36     | 36     | 0                        | 0                 |

| IT-4    | Depth to Water (in) |        |        |        | Depth to Gravel (in): 55 |                   |
|---------|---------------------|--------|--------|--------|--------------------------|-------------------|
|         | 15 min              | 30 min | 45 min | 60 min | Total Drop (in)          | Drop/Hour (in/hr) |
| Trial 1 | 31                  | 31     | 31     | 31     | 0                        | 0                 |
| Trial 2 | 31                  | 31     | 31     | 31     | 0                        | 0                 |
| Trial 3 | -                   | -      | -      | -      | -                        | -                 |
| Trial 4 | -                   | -      | -      | -      | -                        | -                 |

| IT-5    | Depth to Water (in) |        |        |        | Depth to Gravel (in): 55 |                   |
|---------|---------------------|--------|--------|--------|--------------------------|-------------------|
|         | 15 min              | 30 min | 45 min | 60 min | Total Drop (in)          | Drop/Hour (in/hr) |
| Trial 1 | 35                  | 35     | 35     | 35     | 0                        | 0                 |
| Trial 2 | 35                  | 35     | 35     | 35     | 0                        | 0                 |
| Trial 3 | -                   | -      | -      | -      | -                        | -                 |
| Trial 4 | -                   | -      | -      | -      | -                        | -                 |



## INFILTRATION TEST LOGS

|                                     |                                                        |
|-------------------------------------|--------------------------------------------------------|
| <b>John Turner Consulting, Inc.</b> | <b>Site Location: 300 Flynn Avenue, Burlington, VT</b> |
|-------------------------------------|--------------------------------------------------------|

| IT-6    | Depth to Water (in) |        |        |        | Depth to Gravel (in): 52 |                   |
|---------|---------------------|--------|--------|--------|--------------------------|-------------------|
|         | 15 min              | 30 min | 45 min | 60 min | Total Drop (in)          | Drop/Hour (in/hr) |
| Trial 1 | 32                  | 32     | 32     | 32     | 0                        | 0                 |
| Trial 2 | 32                  | 32     | 32     | 32     | 0                        | 0                 |
| Trial 3 | -                   | -      | -      | -      | -                        | -                 |
| Trial 4 | -                   | -      | -      | -      | -                        | -                 |

## **APPENDIX F: GEOTECHNICAL LABORATORY TESTING REPORTS**

PERCENT FINER

GRAIN SIZE - mm.

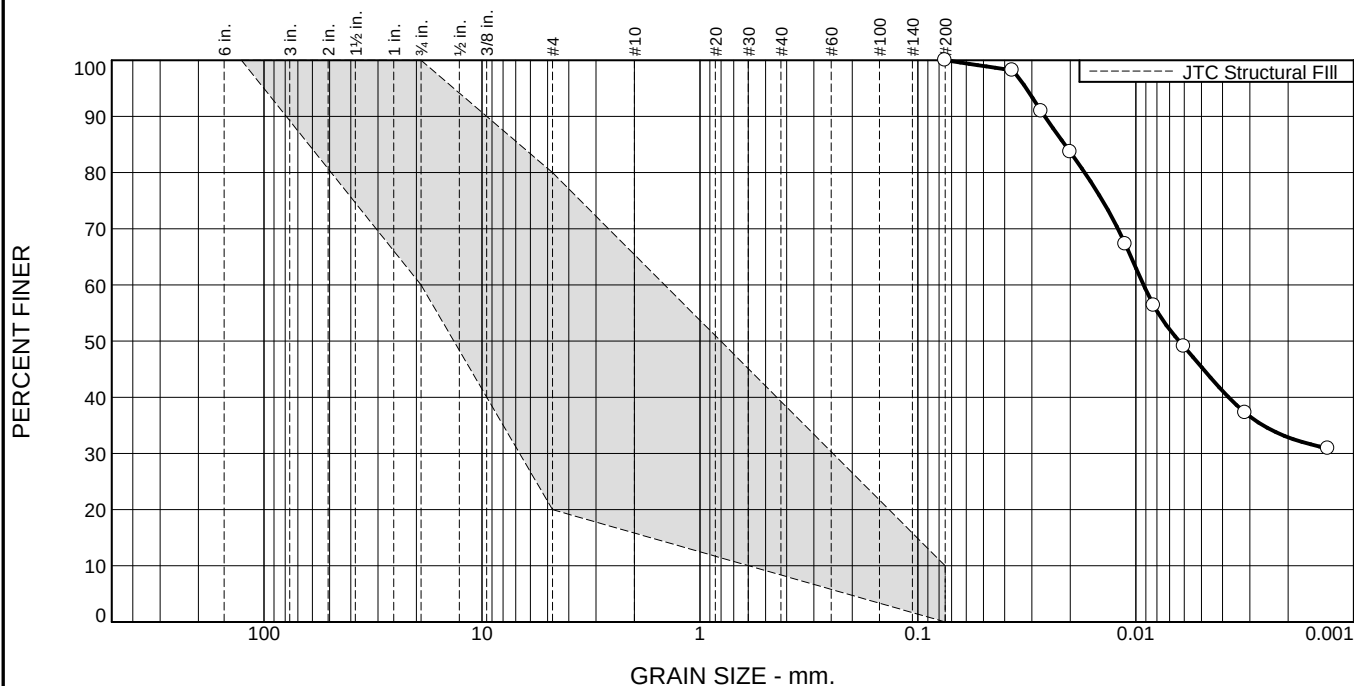
----- JTC Structural Fill

| Grain Size (mm) | Percent Finer (%) |
|-----------------|-------------------|
| 60              | 100               |
| 30              | 100               |
| 15              | 100               |
| 7.5             | 100               |
| 3.75            | 100               |
| 1.9             | 95                |
| 0.85            | 86                |
| 0.425           | 91                |
| 0.25            | 92                |
| 0.15            | 93                |
| 0.075           | 94                |
| 0.0475          | 95                |
| 0.025           | 96                |
| 0.015           | 97                |
| 0.0075          | 98                |
| 0.00475         | 99                |
| 0.0025          | 100               |

| Test Results (ASTM C 136 & ASTM C 117) |               |                     |                   |
|----------------------------------------|---------------|---------------------|-------------------|
| Opening Size                           | Percent Finer | Spec.*<br>(Percent) | Pass?<br>(X=Fail) |
| 1"                                     | 100.0         |                     |                   |
| 3/4"                                   | 93.9          | 60.0 - 100.0        |                   |
| 1/2"                                   | 92.8          |                     |                   |
| 3/8"                                   | 91.7          |                     |                   |
| #4                                     | 90.7          | 20.0 - 80.0         | X                 |
| #10                                    | 85.8          |                     |                   |
| 0.0489 mm.                             | 32.9          |                     |                   |
| 0.0352 mm.                             | 27.7          |                     |                   |
| 0.0254 mm.                             | 22.5          |                     |                   |
| 0.0133 mm.                             | 18.1          |                     |                   |
| 0.0095 mm.                             | 14.7          |                     |                   |
| 0.0068 mm.                             | 12.1          |                     |                   |
| 0.0034 mm.                             | 8.6           |                     |                   |
| 0.0014 mm.                             | 3.4           |                     |                   |

**Title:** Lab manager

# Particle Size Distribution Report



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0.0   | 0.0      | 0.0  | 0.0    | 0.0    | 0.0  | 54.6    | 45.4 |

| Test Results (ASTM C 136 & ASTM C 117) |               |                  |                |
|----------------------------------------|---------------|------------------|----------------|
| Opening Size                           | Percent Finer | Spec.* (Percent) | Pass? (X=Fail) |
| #200                                   | 100.0         | 0.0 - 10.0       | X              |
| 0.0368 mm.                             | 98.2          |                  |                |
| 0.0272 mm.                             | 90.9          |                  |                |
| 0.0200 mm.                             | 83.6          |                  |                |
| 0.0112 mm.                             | 67.3          |                  |                |
| 0.0083 mm.                             | 56.3          |                  |                |
| 0.0060 mm.                             | 49.1          |                  |                |
| 0.0031 mm.                             | 37.2          |                  |                |
| 0.0013 mm.                             | 30.9          |                  |                |

\* JTC Structural Fill

**Material Description**

Lean Clay

**Atterberg Limits (ASTM D 4318)**

PL= 17 LL= 28 PI= 11

**Classification**

USCS (D 2487)= CL AASHTO (M 145)= A-6(10)

**Coefficients**

D<sub>90</sub>= 0.0262 D<sub>85</sub>= 0.0212 D<sub>60</sub>= 0.0092  
D<sub>50</sub>= 0.0063 D<sub>30</sub>= D<sub>15</sub>=  
D<sub>10</sub>= C<sub>u</sub>= C<sub>c</sub>=

**Remarks**

Moisture: 27.4%

**Date Received:** 12/13/22 **Date Tested:** 12/21

**Tested By:** AA

**Checked By:** Adam Allen

**Title:** Lab Manager

Location: B-3 SS06  
Sample Number: VT22-242

Date Sampled: 12/13/22



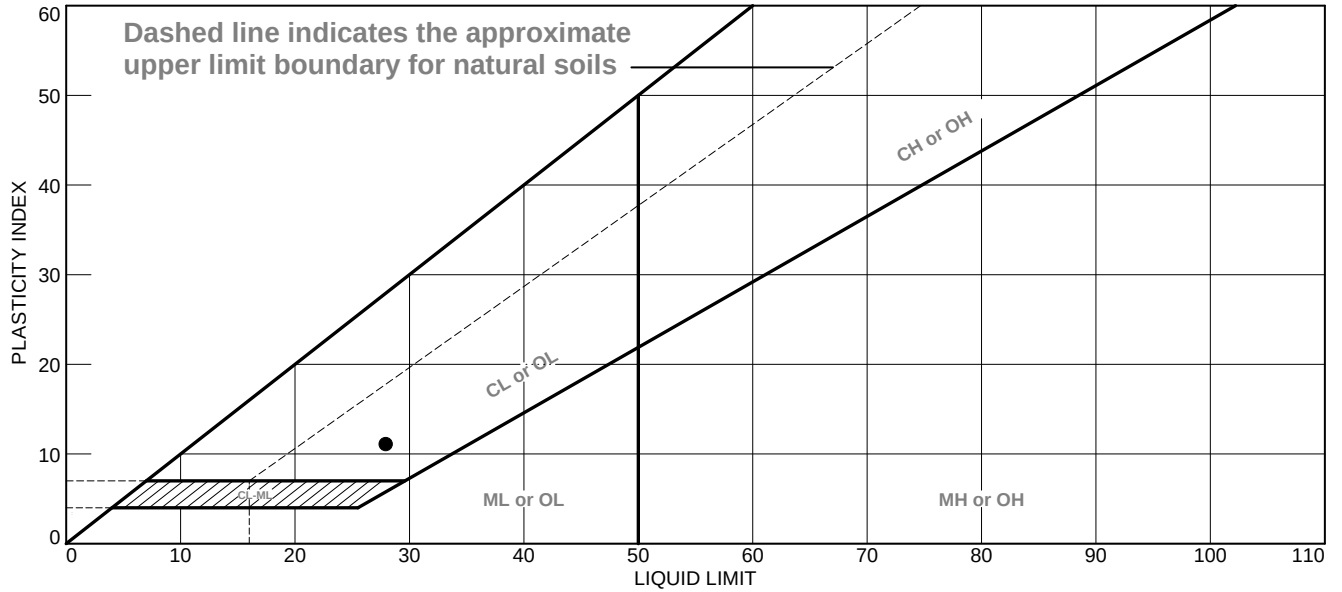
**Client:** Howard Center  
**Project:** Howard Center Redevelopment Project

**Project No:** 22-04-138

**Figure** 001



# LIQUID AND PLASTIC LIMITS TEST REPORT



|   | MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|---|----------------------|----|----|----|-------|--------|------|
| ● | Lean Clay            | 28 | 17 | 11 | 100   | 100    | CL   |

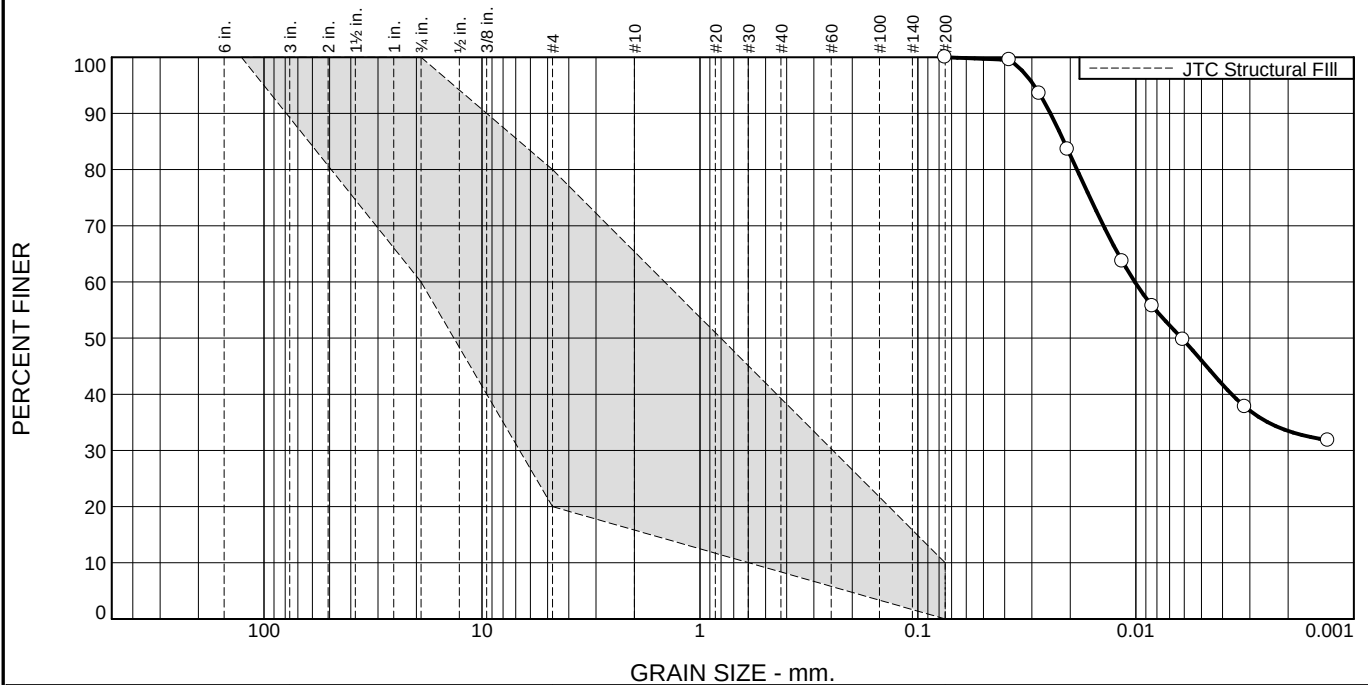
  

|                                                                                                                                                                                 |                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Project No.</b> 22-04-138 <b>Client:</b> Howard Center<br><b>Project:</b> Howard Center Redevelopment Project<br><b>Location:</b> B-3 SS06<br><b>Sample Number:</b> VT22-242 | <b>Remarks:</b> |
|                                                                                              |                 |

Figure 001B

Tested By: AA      Checked By: Adam Allen

# Particle Size Distribution Report



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0.0   | 0.0      | 0.0  | 0.0    | 0.0    | 0.0  | 54.0    | 46.0 |

| Test Results (ASTM C 136 & ASTM C 117) |               |                  |                |
|----------------------------------------|---------------|------------------|----------------|
| Opening Size                           | Percent Finer | Spec.* (Percent) | Pass? (X=Fail) |
| #200                                   | 100.0         | 0.0 - 10.0       | X              |
| 0.0380 mm.                             | 99.5          |                  |                |
| 0.0277 mm.                             | 93.6          |                  |                |
| 0.0206 mm.                             | 83.6          |                  |                |
| 0.0115 mm.                             | 63.7          |                  |                |
| 0.0084 mm.                             | 55.7          |                  |                |
| 0.0061 mm.                             | 49.7          |                  |                |
| 0.0032 mm.                             | 37.8          |                  |                |
| 0.0013 mm.                             | 31.8          |                  |                |

\* JTC Structural Fill

|                                       |                          |                              |
|---------------------------------------|--------------------------|------------------------------|
| <b>Material Description</b>           |                          |                              |
| Silt                                  |                          |                              |
| <b>Atterberg Limits (ASTM D 4318)</b> |                          |                              |
| PL= 24                                | LL= 31                   | PI= 7                        |
| <b>Classification</b>                 |                          |                              |
| USCS (D 2487)= ML                     | AASHTO (M 145)= A-4(8)   |                              |
| <b>Coefficients</b>                   |                          |                              |
| D <sub>90</sub> = 0.0247              | D <sub>85</sub> = 0.0214 | D <sub>60</sub> = 0.0101     |
| D <sub>50</sub> = 0.0062              | D <sub>30</sub> =        | D <sub>15</sub> =            |
| D <sub>10</sub> =                     | C <sub>u</sub> =         | C <sub>c</sub> =             |
| <b>Remarks</b>                        |                          |                              |
| Moisture: 26.5%                       |                          |                              |
| <b>Date Received:</b> 12/13/22        |                          | <b>Date Tested:</b> 12/21/22 |
| <b>Tested By:</b> AA                  |                          |                              |
| <b>Checked By:</b> Adam Allen         |                          |                              |
| <b>Title:</b> Lab manager             |                          |                              |

Location: B-5 SS04  
Sample Number: VT22-243

Date Sampled: 12/13/22

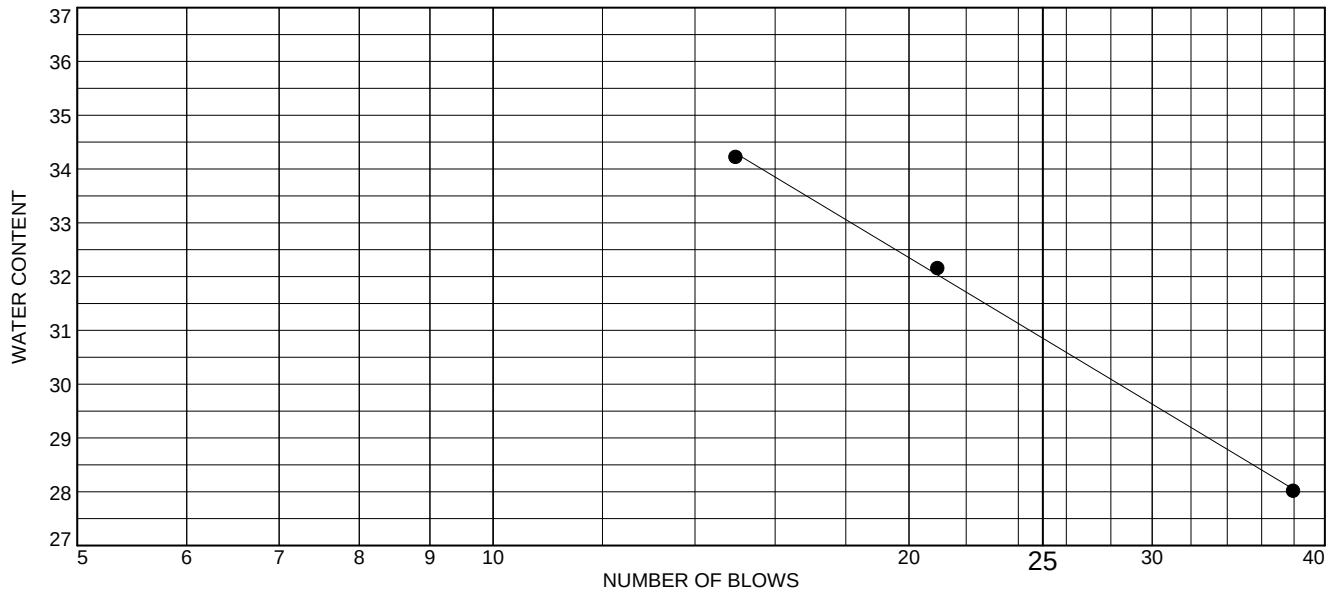
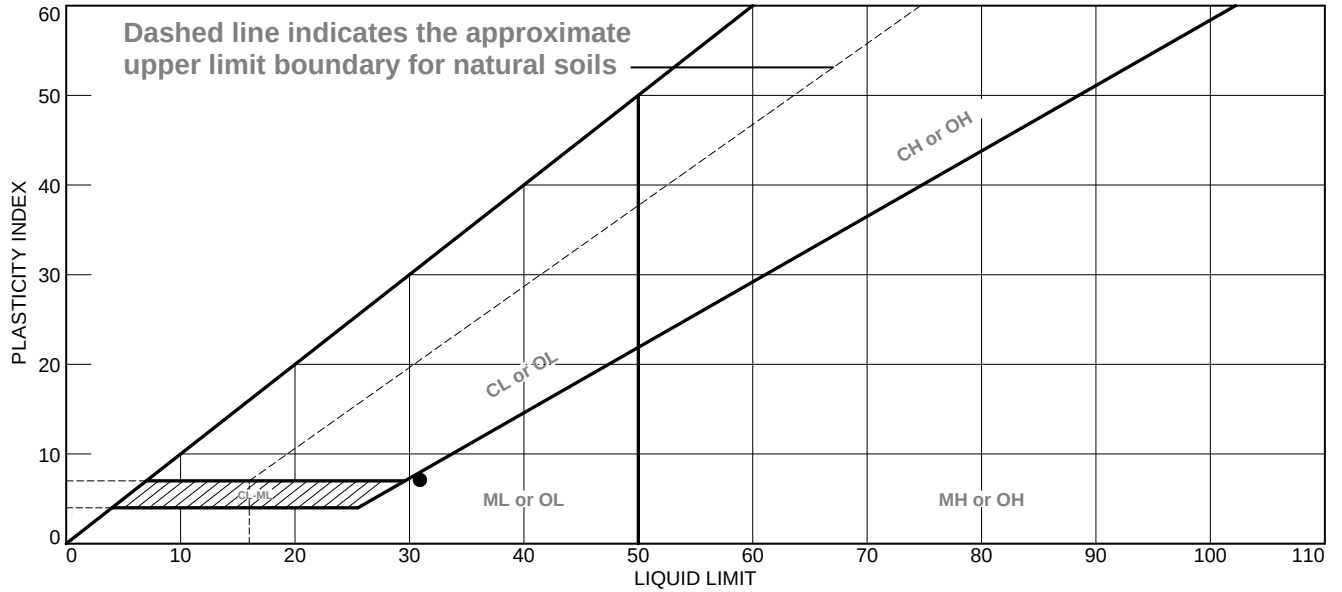


Client: Howard Center  
Project: Howard Center Redevelopment Project

Project No: 22-04-138

Figure 002

# LIQUID AND PLASTIC LIMITS TEST REPORT



|   | MATERIAL DESCRIPTION | LL | PL | PI | %<#40 | %<#200 | USCS |
|---|----------------------|----|----|----|-------|--------|------|
| ● | Silt                 | 31 | 24 | 7  | 100.0 | 100.0  | ML   |

**Project No.** 22-04-138 **Client:** Howard Center

**Project:** Howard Center Redevelopment Project

**Location:** B-5 SS04

**Sample Number:** VT22-243

**Remarks:**



**Figure** 002B

**Tested By:** AA



Client: John Turner Consulting, Inc  
 Project Name: Howard Center  
 Project Location: Burlington, VA

GTX #: 316555  
 Test Date: 12/13/22

Tested By: MD  
 Checked By: ank

Tube Handling with  
 Moisture Content (ASTM D2216), Density of Soil (ASTM D7263),  
 Hand-Held Torvane, & Visual Description

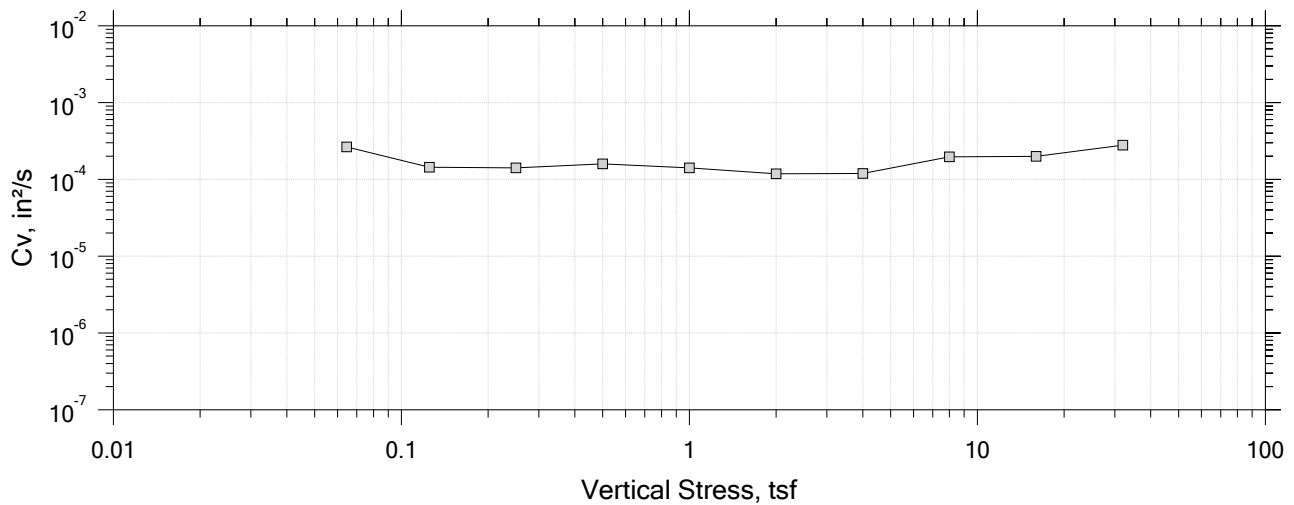
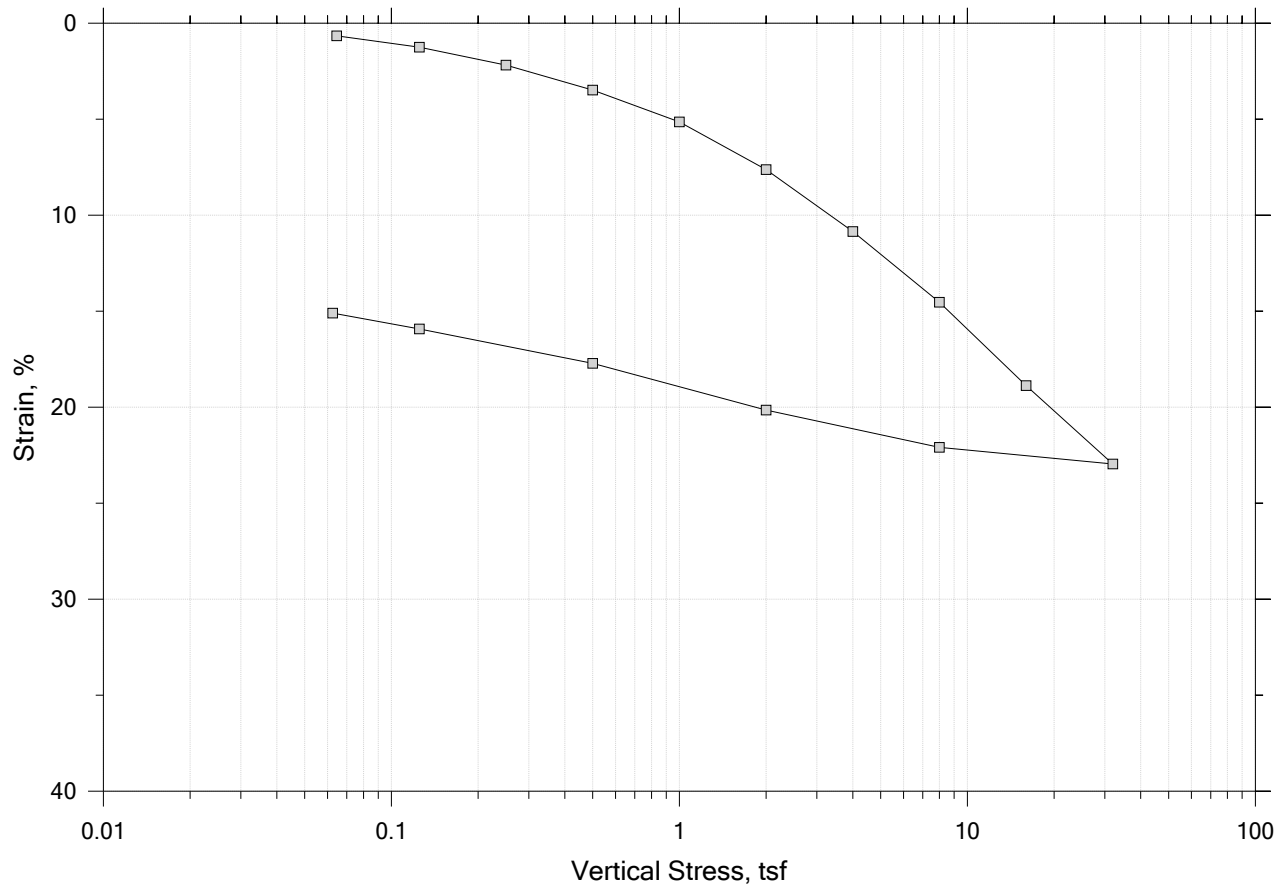
| Boring ID | Sample ID | Depth, ft | Section | Visual Description         | Bulk Density, lb/ft <sup>3</sup> | Moisture Content, % | Dry Density, lb/ft <sup>3</sup> | Hand Held Torvane Readings, tsf |      |      |         |
|-----------|-----------|-----------|---------|----------------------------|----------------------------------|---------------------|---------------------------------|---------------------------------|------|------|---------|
|           |           |           |         |                            |                                  |                     |                                 | 1                               | 2    | 3    | Average |
| B-3       | ---       | 25-27     | Top     | Moist,brown clay with sand | 110.7                            | 41.6                | 78.2                            | 0.40                            | 0.35 | 0.30 | 0.35    |
|           |           |           | Middle  | Moist,brown clay with sand | 120.3                            | 29.6                | 92.8                            | 0.32                            | 0.35 | 0.35 | 0.34    |
|           |           |           | Bottom  | Moist,brown clay with sand | 120.6                            | 26.9                | 95.0                            | 0.90                            | 1.13 | 0.60 | 0.88    |
| B-4       | ---       | 25-27     | Top     | Moist, brown clay          | 104.0                            | 46.7                | 70.9                            | 0.40                            | 0.30 | 0.38 | 0.36    |
|           |           |           | Middle  | Moist, brown clay          | 106.5                            | 45.6                | 73.1                            | 0.31                            | 0.37 | 0.35 | 0.34    |
|           |           |           | Bottom  | Moist, brown clay          | 108.4                            | 41.8                | 76                              | 0.30                            | 0.30 | 0.30 | 0.30    |

Notes: Density determined on undisturbed tube samples provided to GeoTesting Express in Shelby tubes  
 Moisture content determined by ASTM D2216 at 110° C



# One-Dimensional Consolidation by ASTM D2435 - Method B

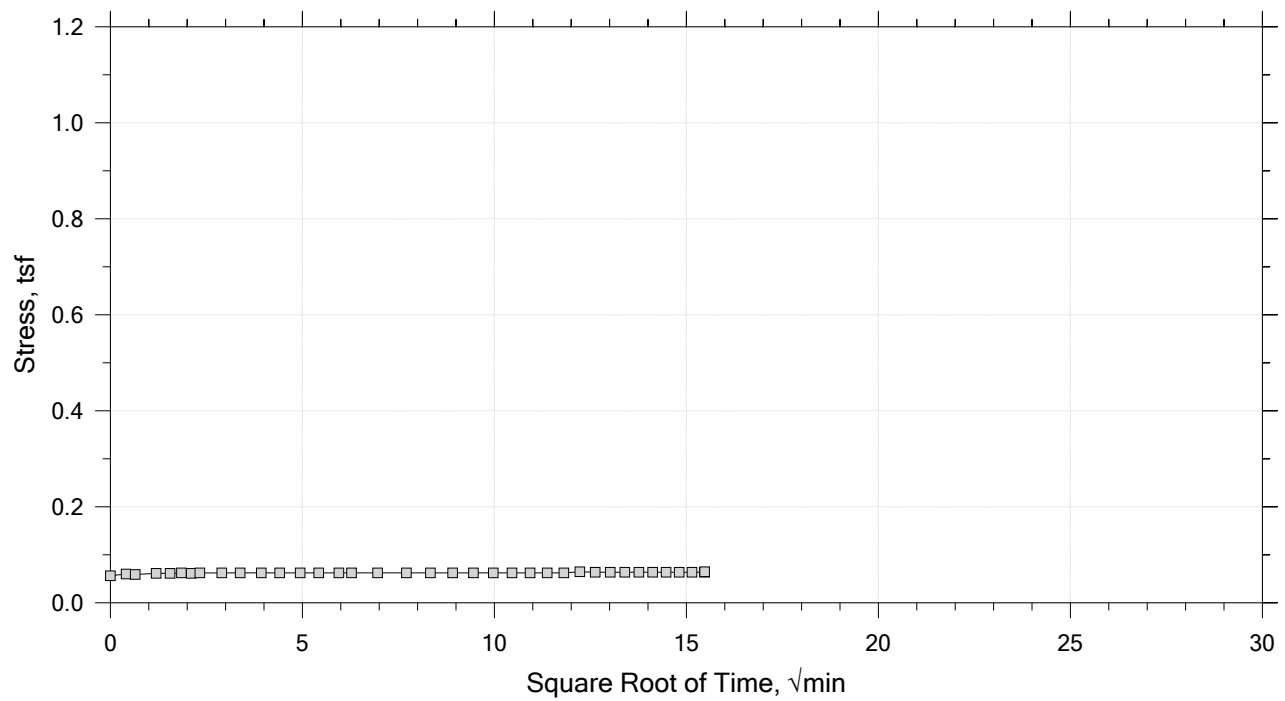
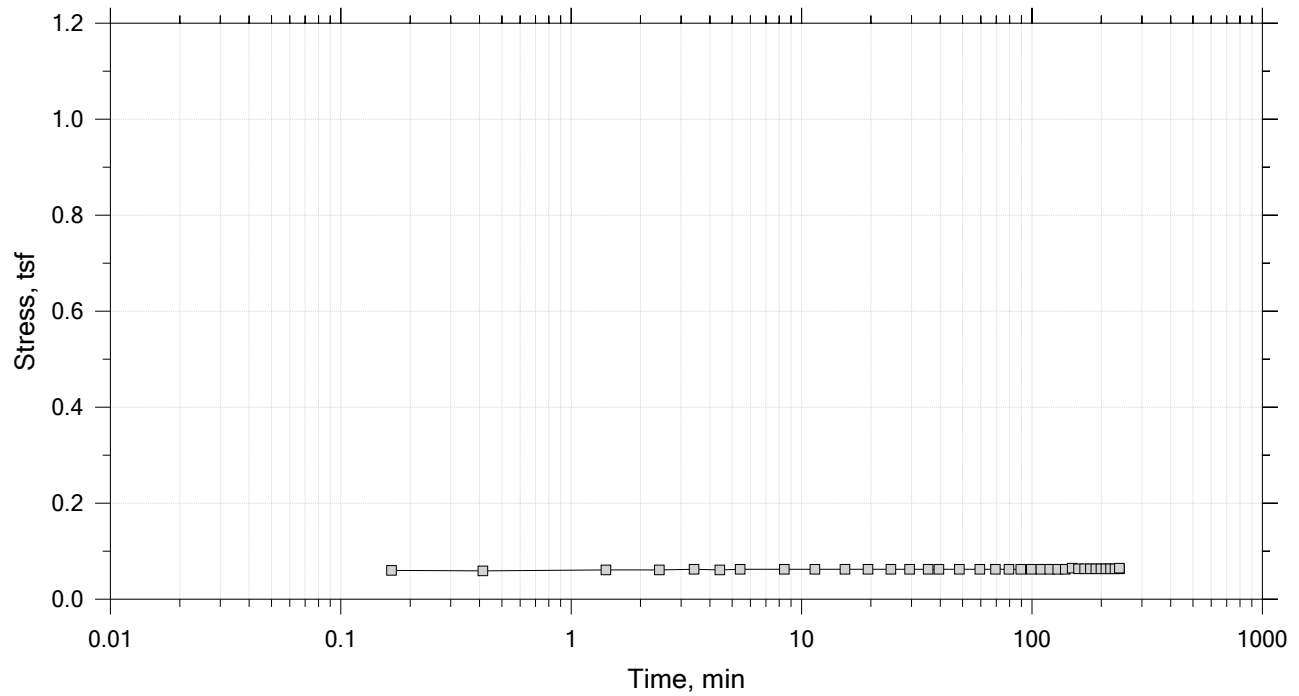
## Summary Report



|                                                                                     |                                                      |                          |                         |
|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Howard Center                               | Location: Burlington, VT | Project No.: GTX-316555 |
|                                                                                     | Boring No.: ---                                      | Tested By: md            | Checked By: anm         |
|                                                                                     | Sample No.: B-3                                      | Test Date: 12/28/22      | Depth: 25-27 ft         |
|                                                                                     | Test No.: IP-1                                       | Sample Type: intact      | Elevation: ---          |
|                                                                                     | Description: Moist, brown clay with sand             |                          |                         |
|                                                                                     | Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf |                          |                         |
|                                                                                     | Displacement at End of Increment                     |                          |                         |

# One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 1 of 15  
Constant Volume Step  
Stress: 0.0646 tsf



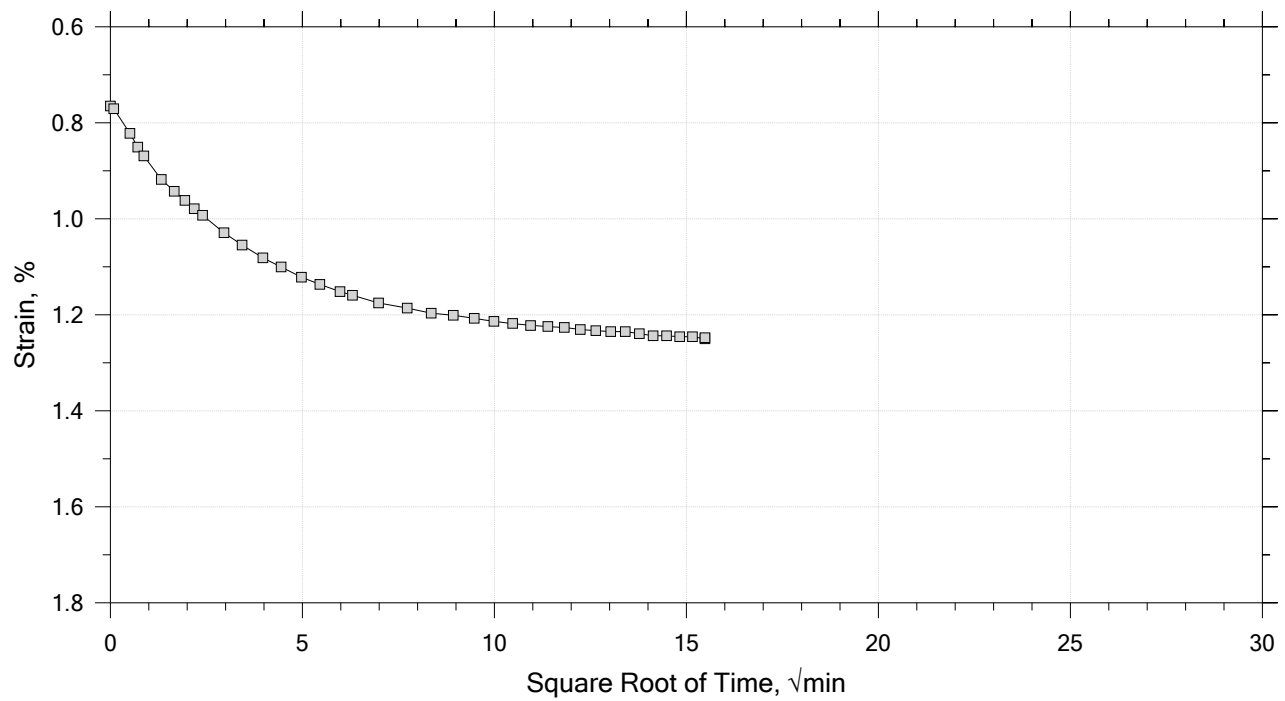
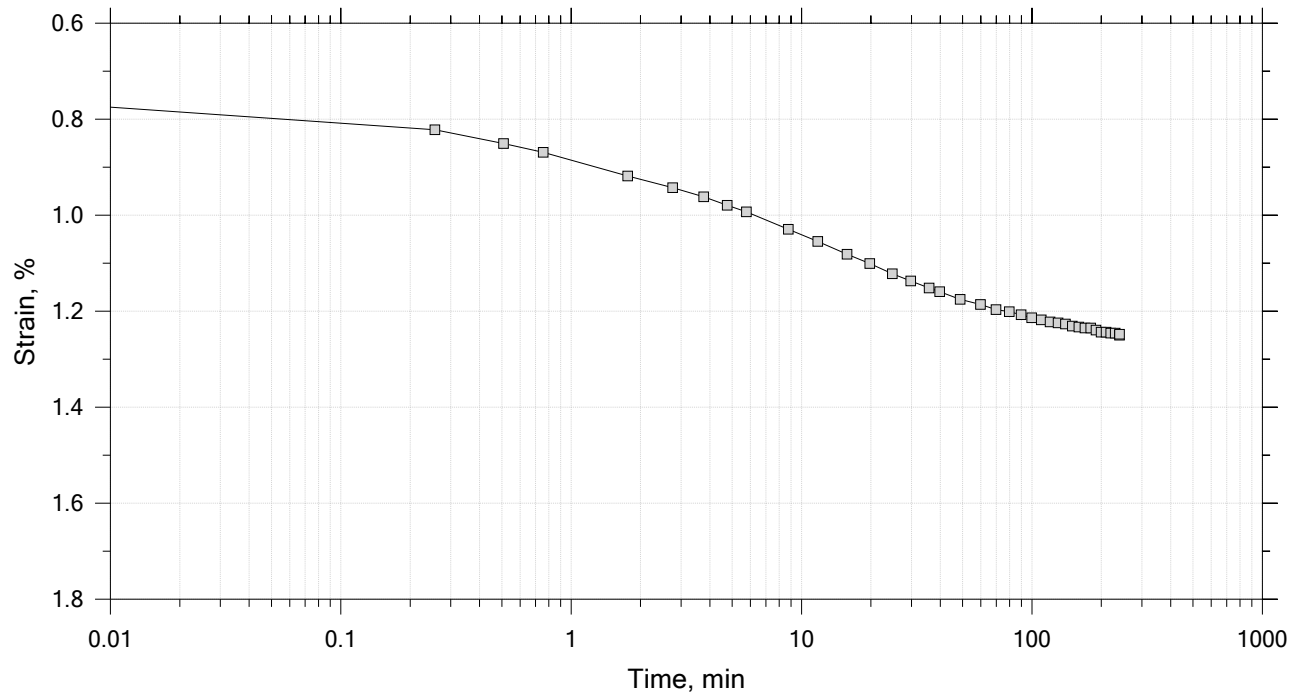
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|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Howard Center                               | Location: Burlington, VT | Project No.: GTX-316555 |
|                                                                                     | Boring No.: ---                                      | Tested By: md            | Checked By: anm         |
|                                                                                     | Sample No.: B-3                                      | Test Date: 12/28/22      | Depth: 25-27 ft         |
|                                                                                     | Test No.: IP-1                                       | Sample Type: intact      | Elevation: ---          |
|                                                                                     | Description: Moist, brown clay with sand             |                          |                         |
|                                                                                     | Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf |                          |                         |
|                                                                                     |                                                      |                          |                         |

# One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 2 of 15

Constant Load Step

Stress: 0.125 tsf



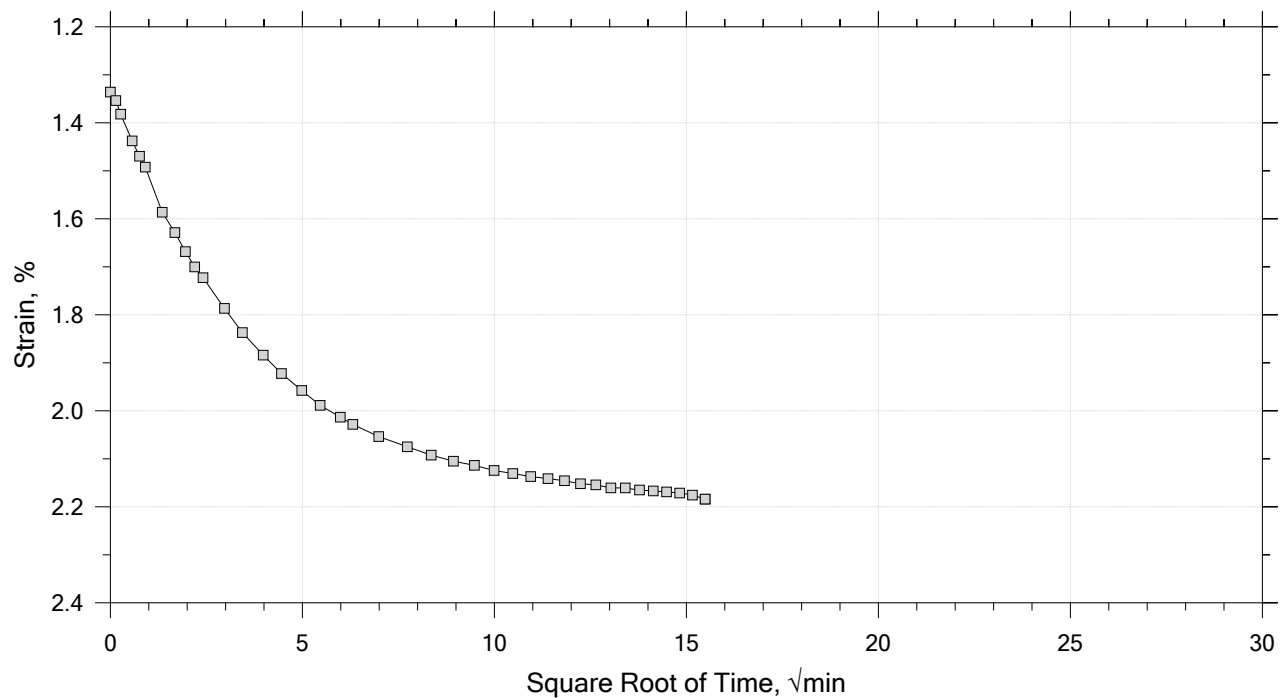
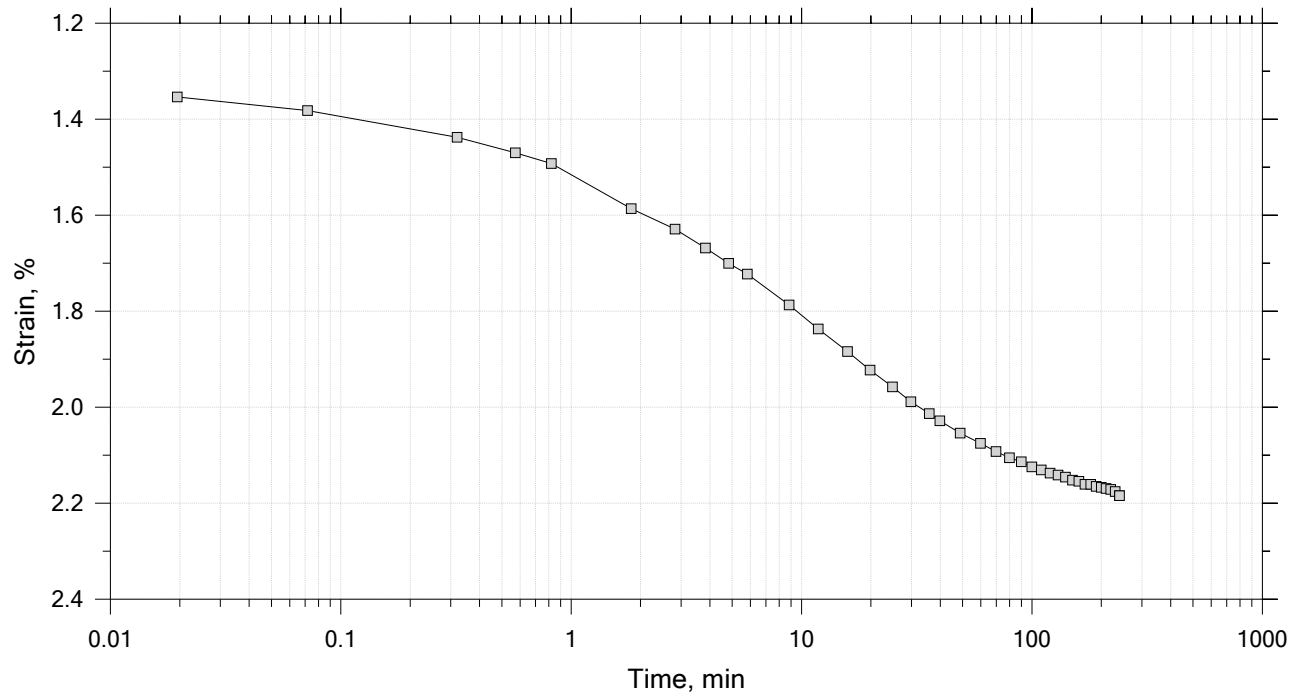
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|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Howard Center                               | Location: Burlington, VT | Project No.: GTX-316555 |
|                                                                                     | Boring No.: ---                                      | Tested By: md            | Checked By: anm         |
|                                                                                     | Sample No.: B-3                                      | Test Date: 12/28/22      | Depth: 25-27 ft         |
|                                                                                     | Test No.: IP-1                                       | Sample Type: intact      | Elevation: ---          |
|                                                                                     | Description: Moist, brown clay with sand             |                          |                         |
|                                                                                     | Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf |                          |                         |
|                                                                                     |                                                      |                          |                         |

# One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 3 of 15

Constant Load Step

Stress: 0.25 tsf



|                                                                                     |                                                      |                          |                         |
|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Howard Center                               | Location: Burlington, VT | Project No.: GTX-316555 |
|                                                                                     | Boring No.: ---                                      | Tested By: md            | Checked By: anm         |
|                                                                                     | Sample No.: B-3                                      | Test Date: 12/28/22      | Depth: 25-27 ft         |
|                                                                                     | Test No.: IP-1                                       | Sample Type: intact      | Elevation: ---          |
|                                                                                     | Description: Moist, brown clay with sand             |                          |                         |
|                                                                                     | Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf |                          |                         |
|                                                                                     |                                                      |                          |                         |

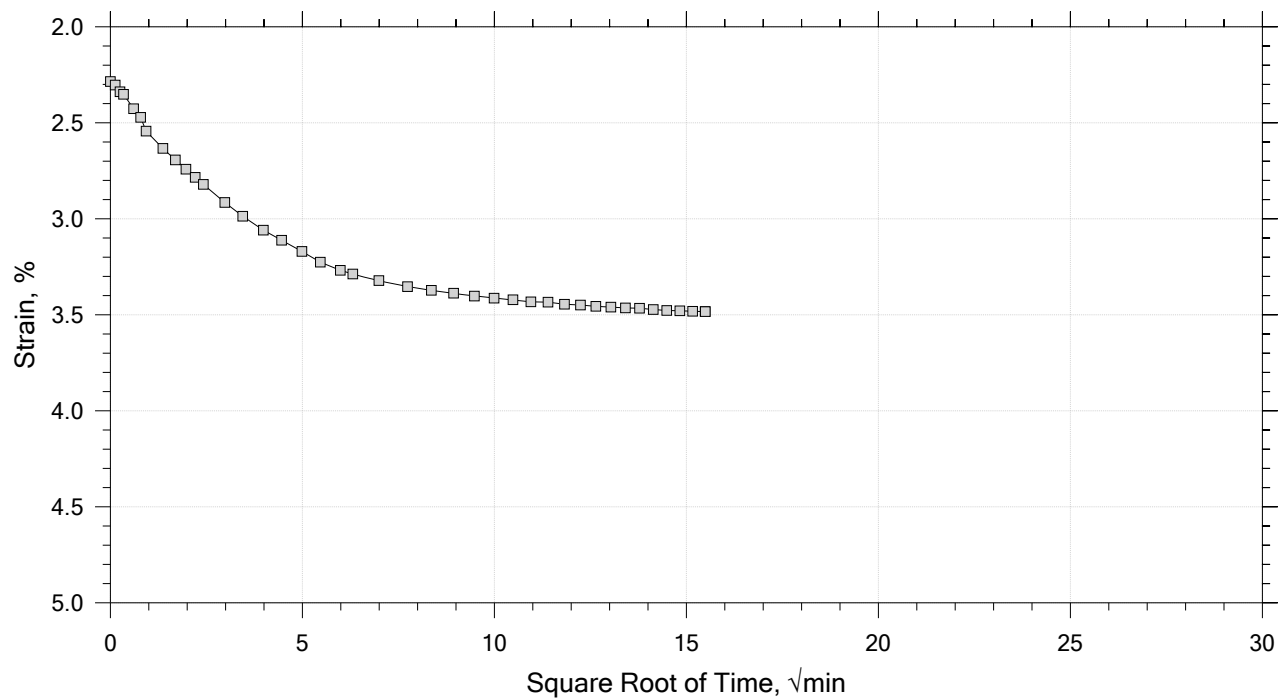
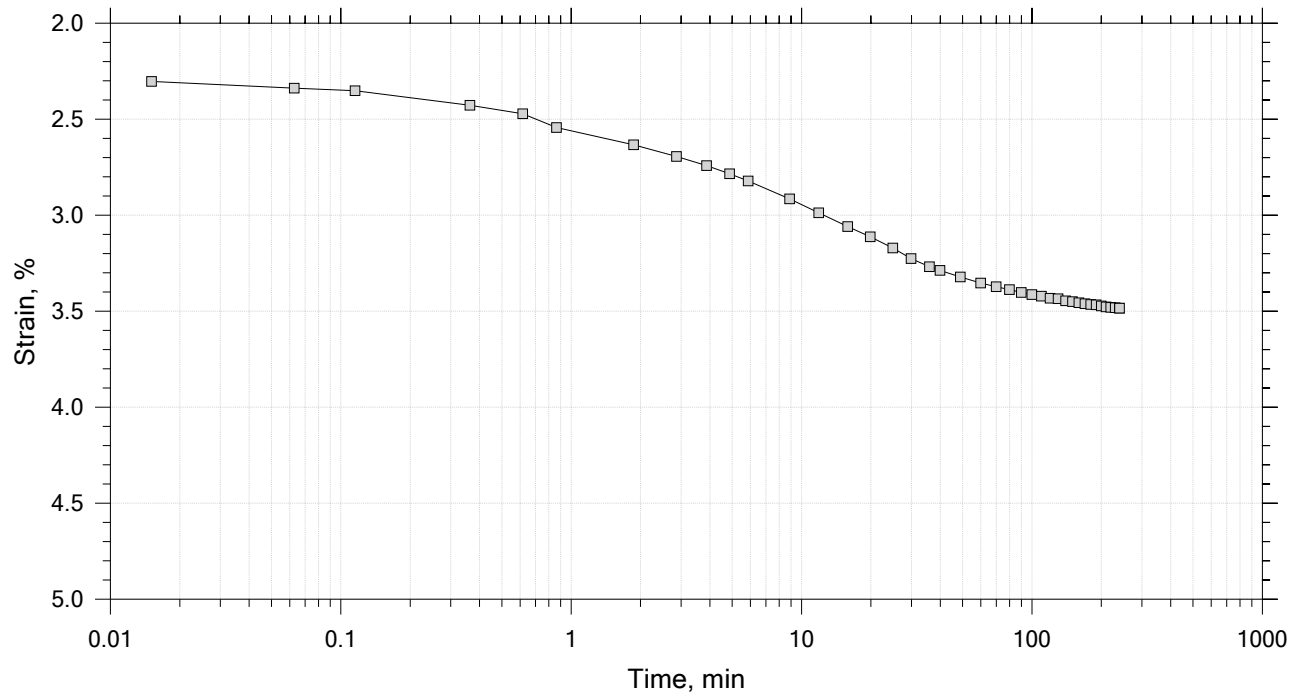


# One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 4 of 15

Constant Load Step

Stress: 0.5 tsf



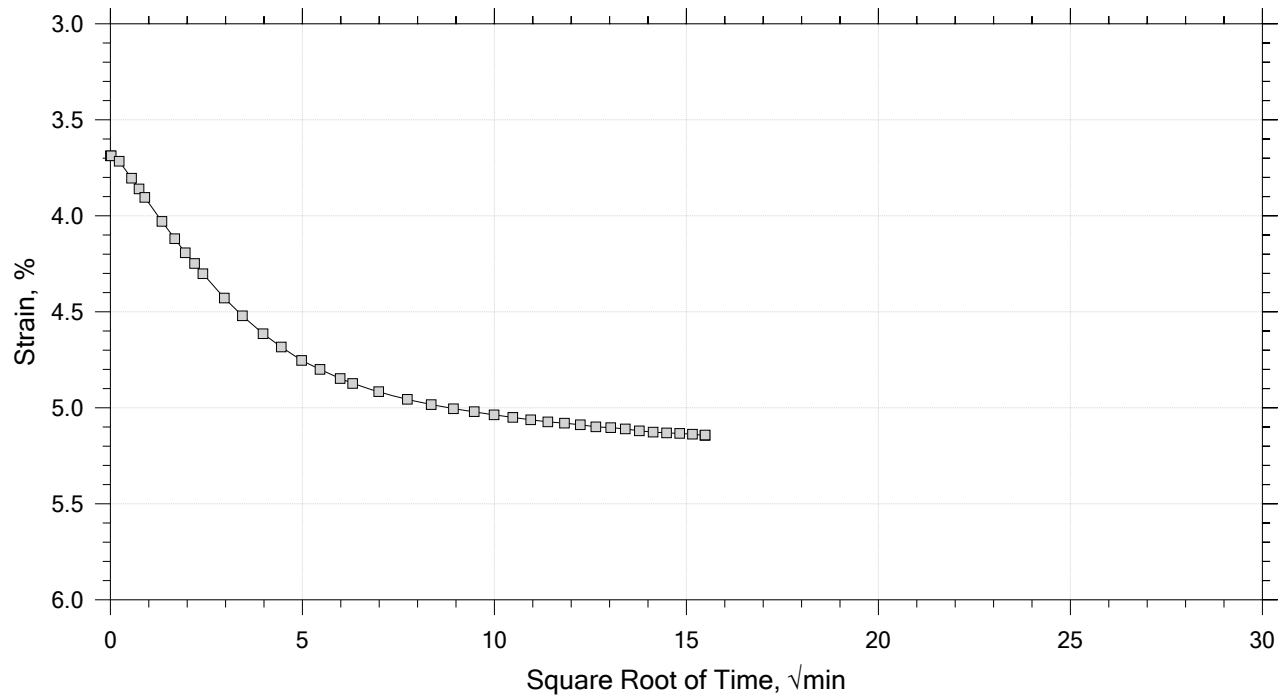
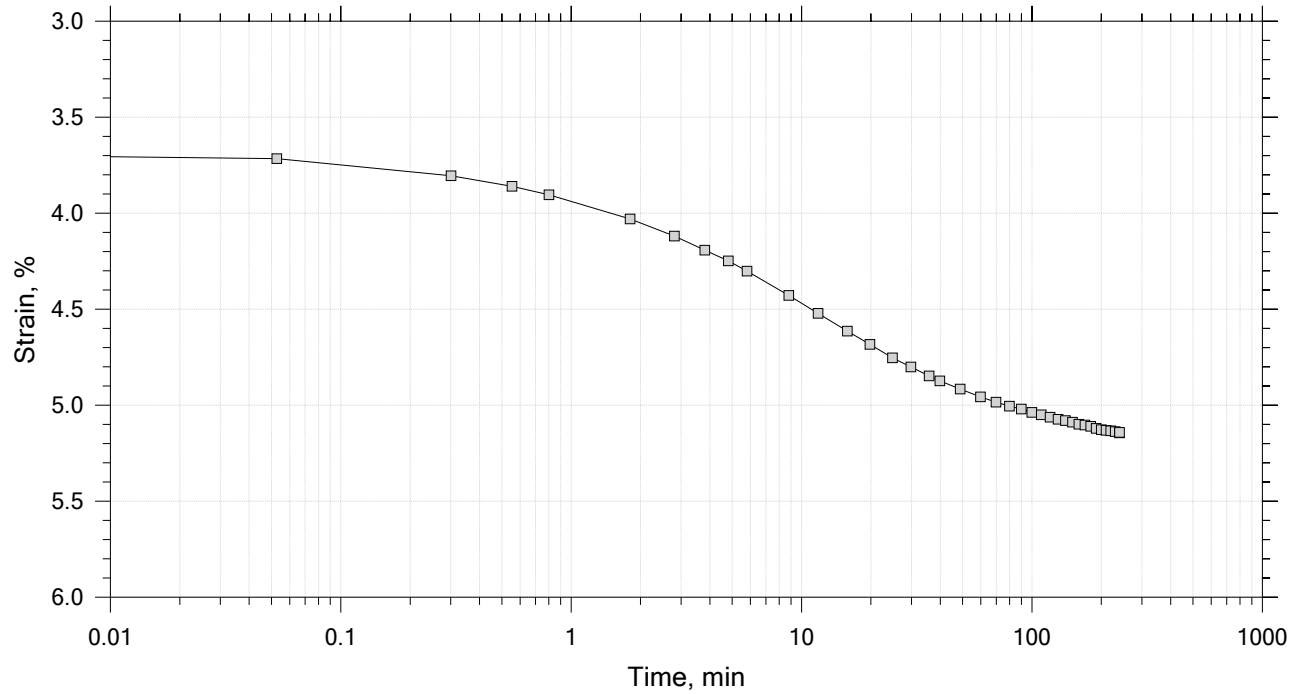
|                                                                                     |                                                      |                          |                         |
|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Howard Center                               | Location: Burlington, VT | Project No.: GTX-316555 |
|                                                                                     | Boring No.: ---                                      | Tested By: md            | Checked By: anm         |
|                                                                                     | Sample No.: B-3                                      | Test Date: 12/28/22      | Depth: 25-27 ft         |
|                                                                                     | Test No.: IP-1                                       | Sample Type: intact      | Elevation: ---          |
|                                                                                     | Description: Moist, brown clay with sand             |                          |                         |
|                                                                                     | Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf |                          |                         |
|                                                                                     |                                                      |                          |                         |

# One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 5 of 15

Constant Load Step

Stress: 1 tsf



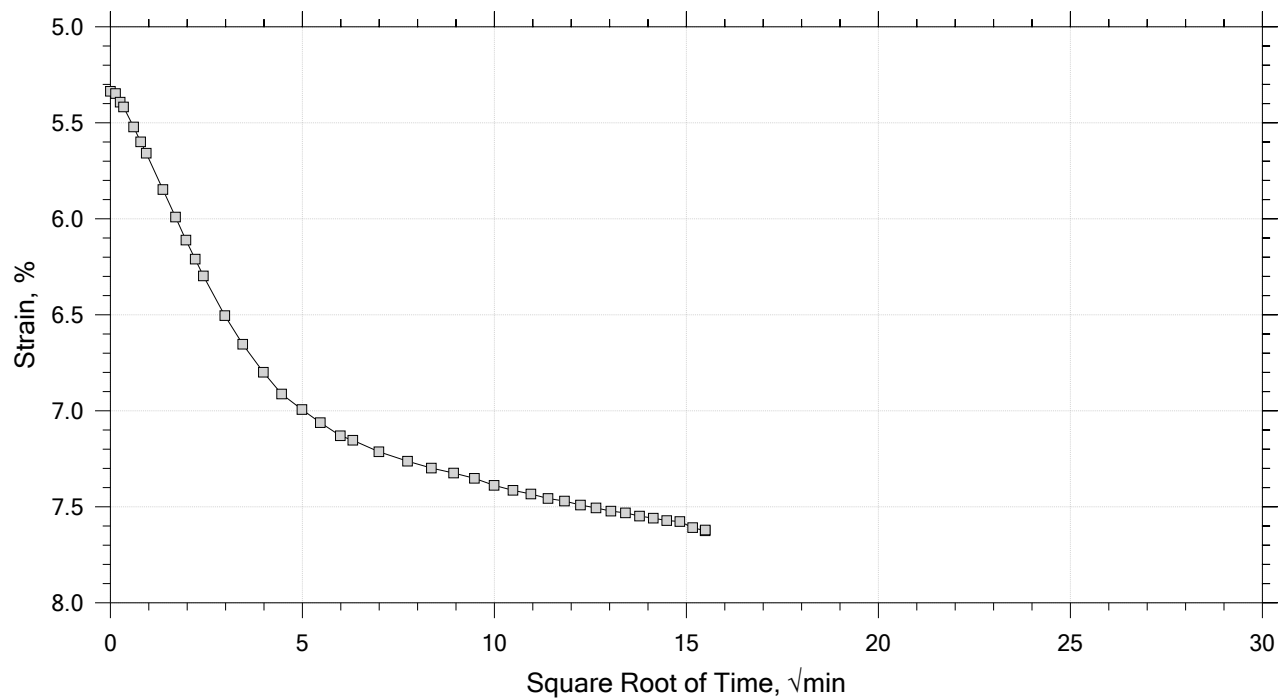
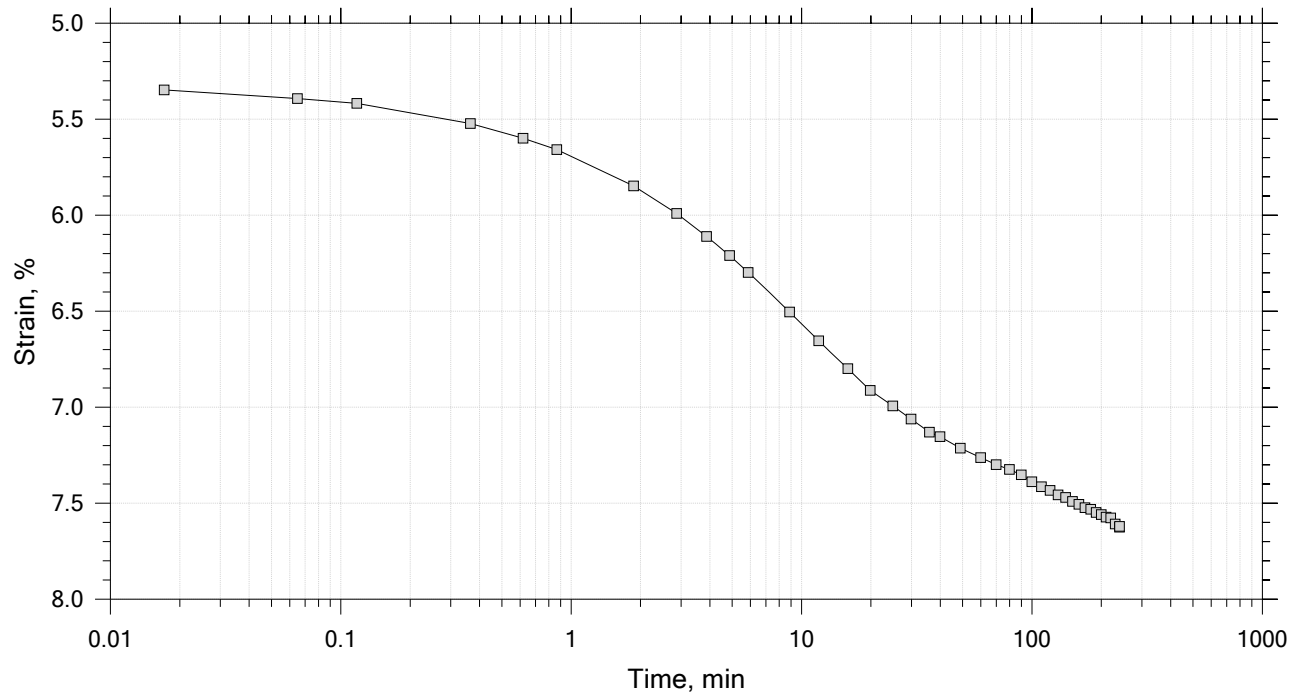
|                                                                                     |                                                      |                          |                         |
|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Howard Center                               | Location: Burlington, VT | Project No.: GTX-316555 |
|                                                                                     | Boring No.: ---                                      | Tested By: md            | Checked By: anm         |
|                                                                                     | Sample No.: B-3                                      | Test Date: 12/28/22      | Depth: 25-27 ft         |
|                                                                                     | Test No.: IP-1                                       | Sample Type: intact      | Elevation: ---          |
|                                                                                     | Description: Moist, brown clay with sand             |                          |                         |
|                                                                                     | Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf |                          |                         |
|                                                                                     |                                                      |                          |                         |

# One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 6 of 15

Constant Load Step

Stress: 2 tsf



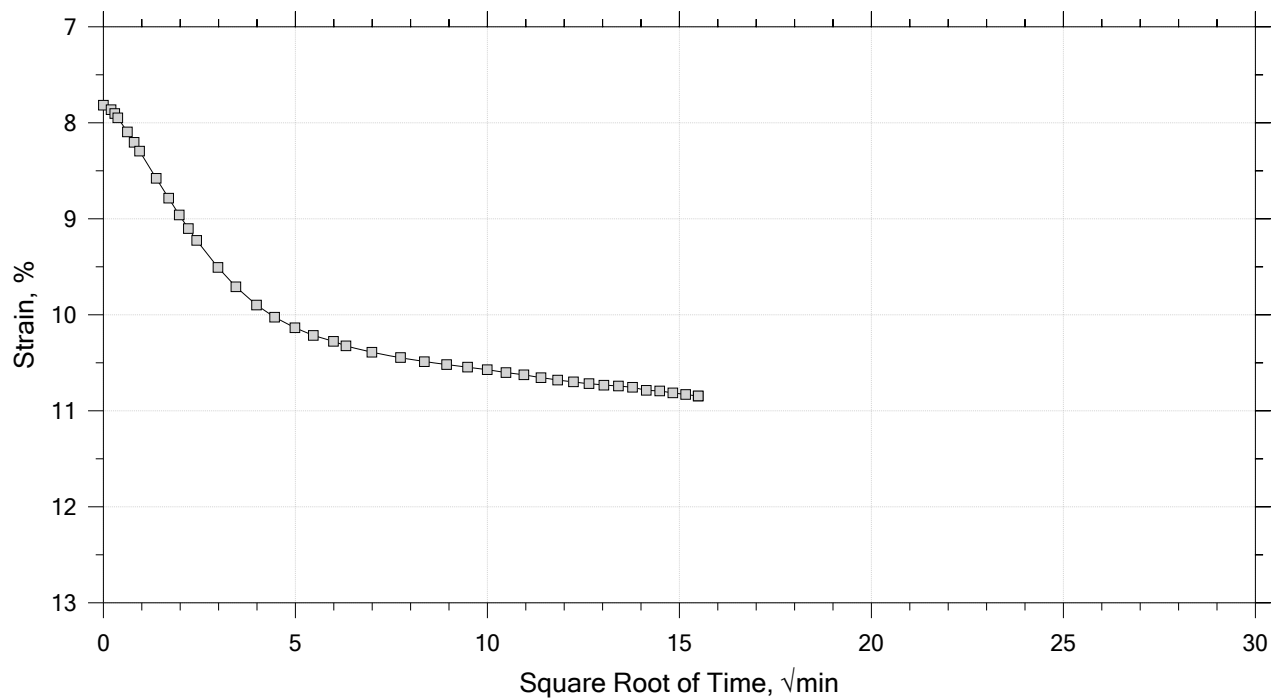
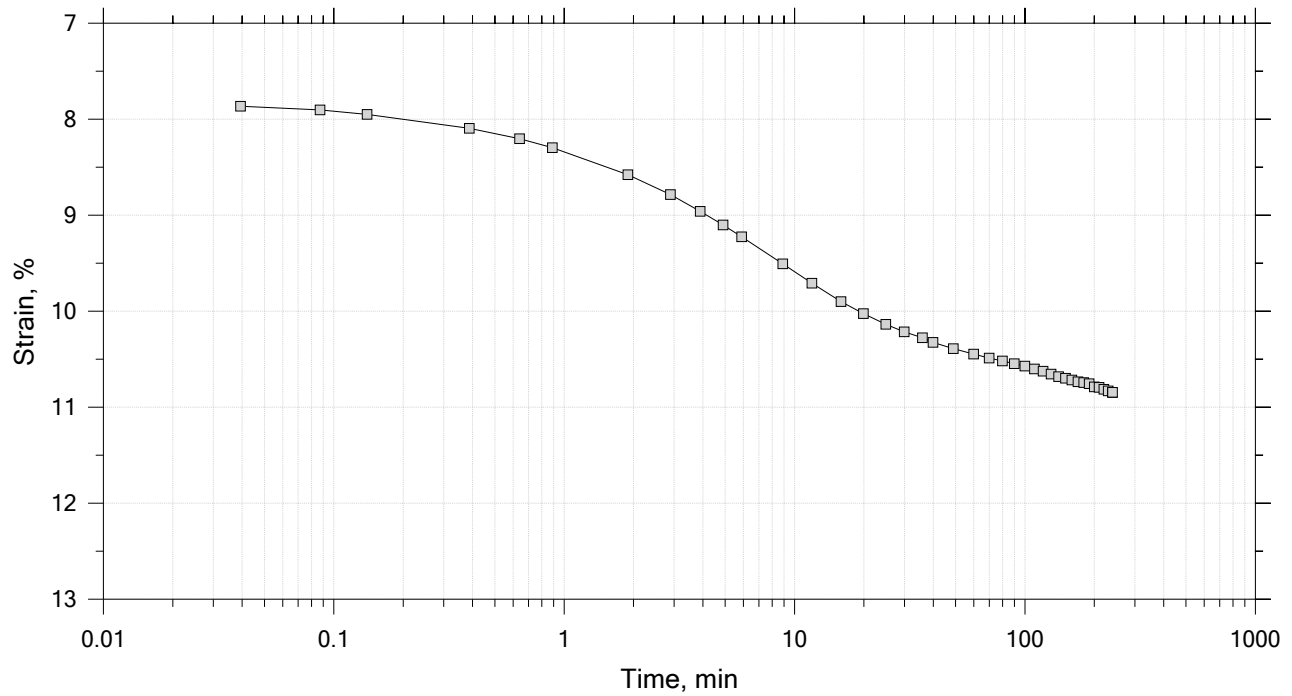
|                                                                                     |                                                      |                          |                         |
|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Howard Center                               | Location: Burlington, VT | Project No.: GTX-316555 |
|                                                                                     | Boring No.: ---                                      | Tested By: md            | Checked By: anm         |
|                                                                                     | Sample No.: B-3                                      | Test Date: 12/28/22      | Depth: 25-27 ft         |
|                                                                                     | Test No.: IP-1                                       | Sample Type: intact      | Elevation: ---          |
|                                                                                     | Description: Moist, brown clay with sand             |                          |                         |
|                                                                                     | Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf |                          |                         |
|                                                                                     |                                                      |                          |                         |

# One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 7 of 15

Constant Load Step

Stress: 4 tsf



|                                                                                     |                                                      |                          |                         |
|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Howard Center                               | Location: Burlington, VT | Project No.: GTX-316555 |
|                                                                                     | Boring No.: ---                                      | Tested By: md            | Checked By: anm         |
|                                                                                     | Sample No.: B-3                                      | Test Date: 12/28/22      | Depth: 25-27 ft         |
|                                                                                     | Test No.: IP-1                                       | Sample Type: intact      | Elevation: ---          |
|                                                                                     | Description: Moist, brown clay with sand             |                          |                         |
|                                                                                     | Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf |                          |                         |
|                                                                                     |                                                      |                          |                         |

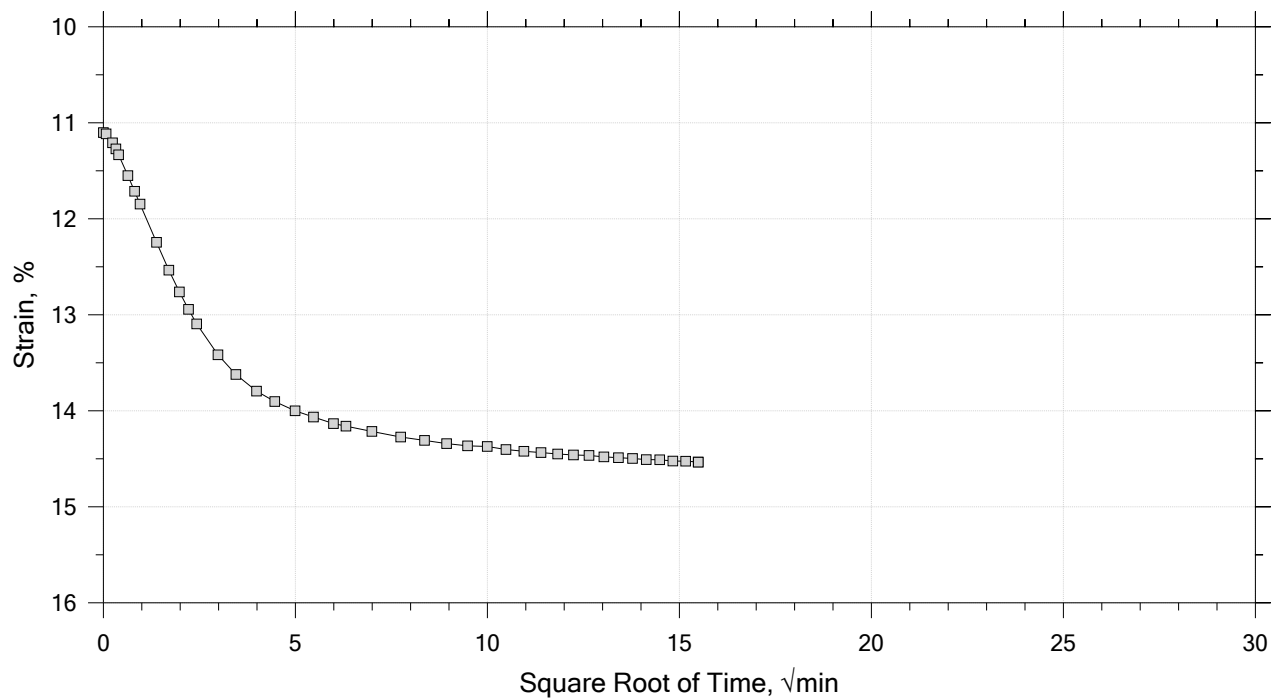
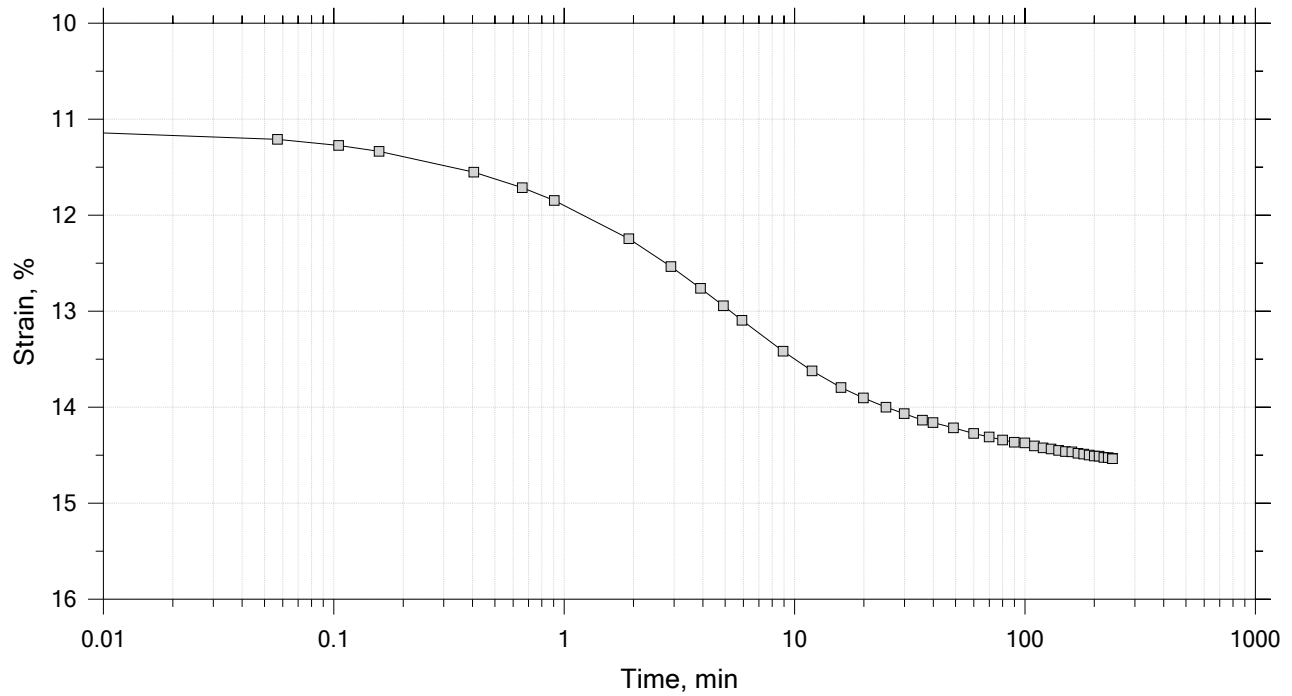


# One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 8 of 15

Constant Load Step

Stress: 8 tsf



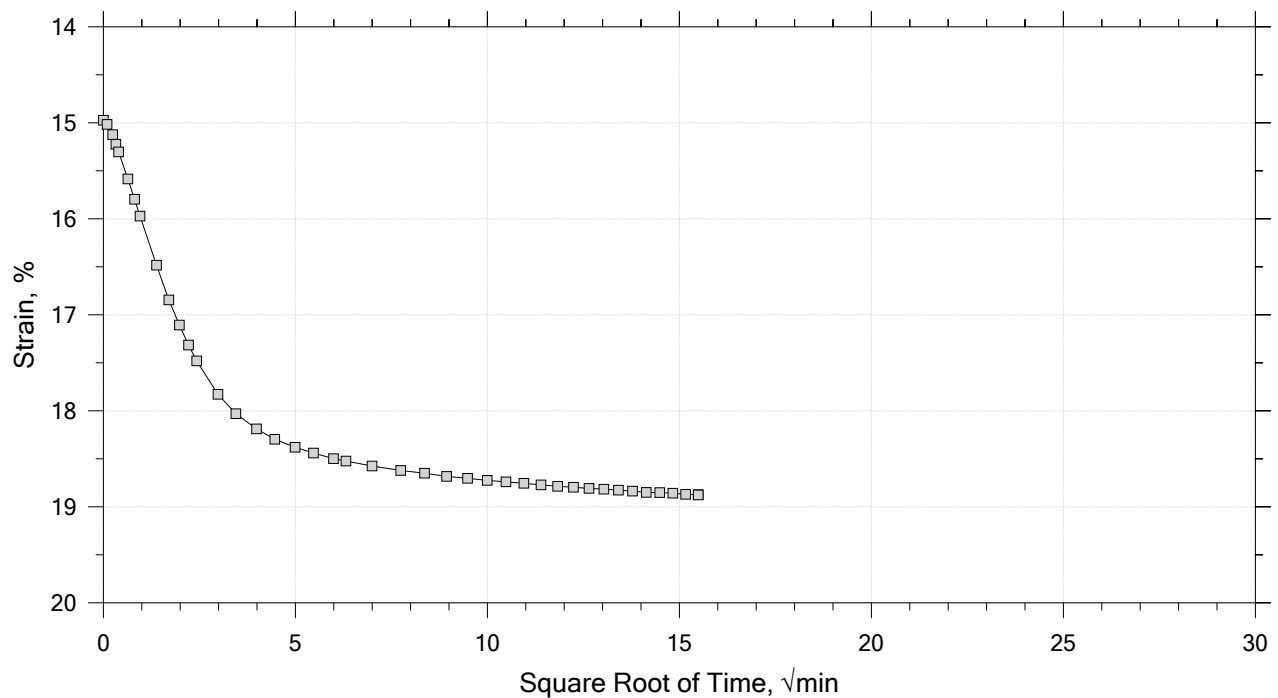
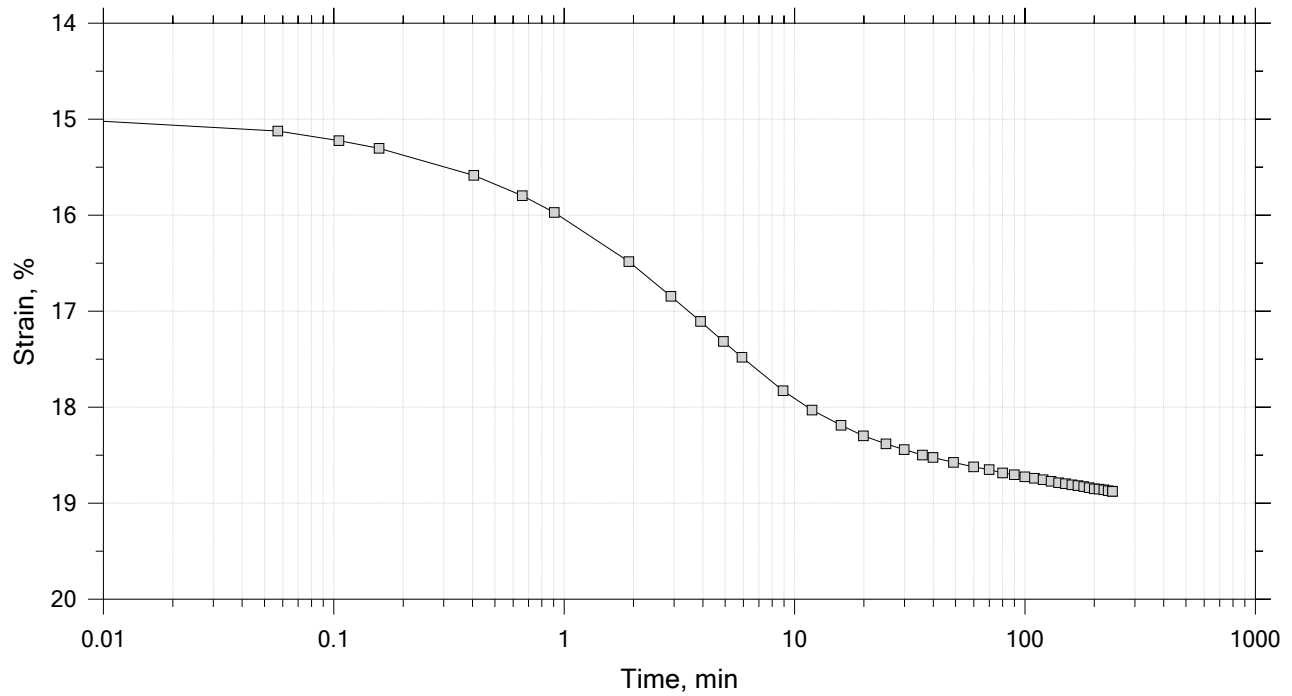
|                                                                                     |                                                      |                          |                         |
|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Howard Center                               | Location: Burlington, VT | Project No.: GTX-316555 |
|                                                                                     | Boring No.: ---                                      | Tested By: md            | Checked By: anm         |
|                                                                                     | Sample No.: B-3                                      | Test Date: 12/28/22      | Depth: 25-27 ft         |
|                                                                                     | Test No.: IP-1                                       | Sample Type: intact      | Elevation: ---          |
|                                                                                     | Description: Moist, brown clay with sand             |                          |                         |
|                                                                                     | Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf |                          |                         |
|                                                                                     |                                                      |                          |                         |

# One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 9 of 15

Constant Load Step

Stress: 16 tsf



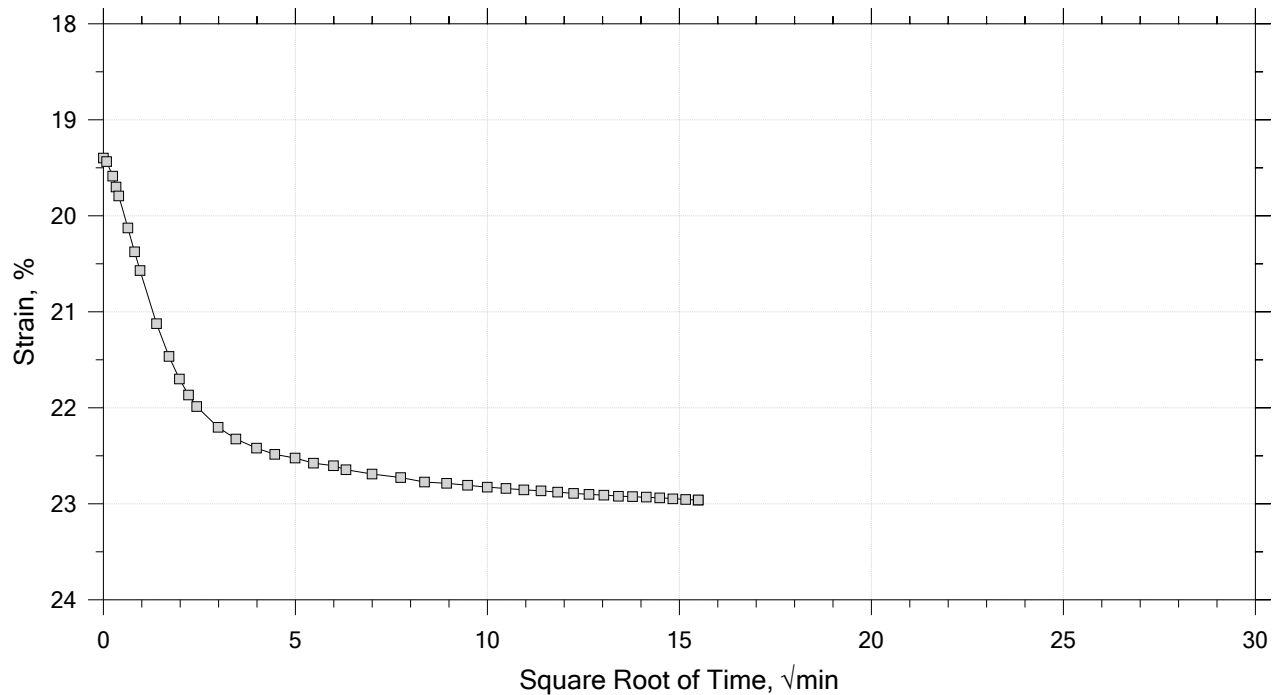
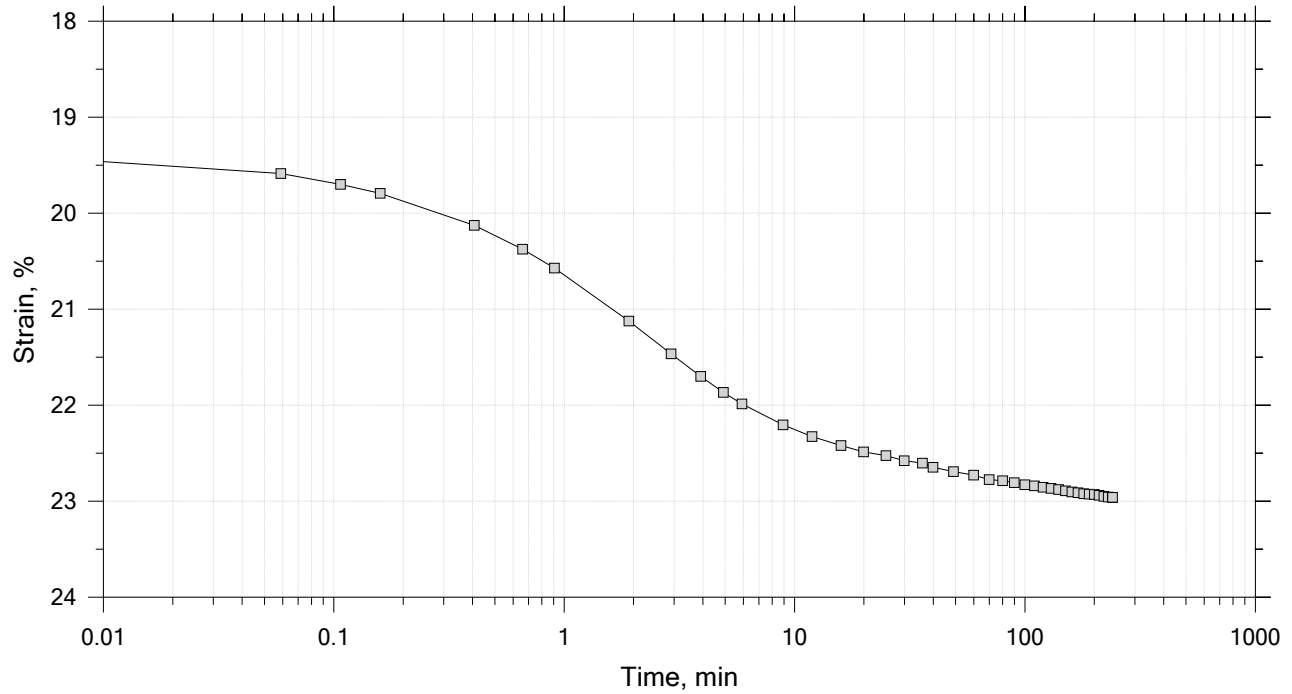
|                                                                                     |                                                      |                          |                         |
|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Howard Center                               | Location: Burlington, VT | Project No.: GTX-316555 |
|                                                                                     | Boring No.: ---                                      | Tested By: md            | Checked By: anm         |
|                                                                                     | Sample No.: B-3                                      | Test Date: 12/28/22      | Depth: 25-27 ft         |
|                                                                                     | Test No.: IP-1                                       | Sample Type: intact      | Elevation: ---          |
|                                                                                     | Description: Moist, brown clay with sand             |                          |                         |
|                                                                                     | Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf |                          |                         |
|                                                                                     |                                                      |                          |                         |

# One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 10 of 15

Constant Load Step

Stress: 32 tsf



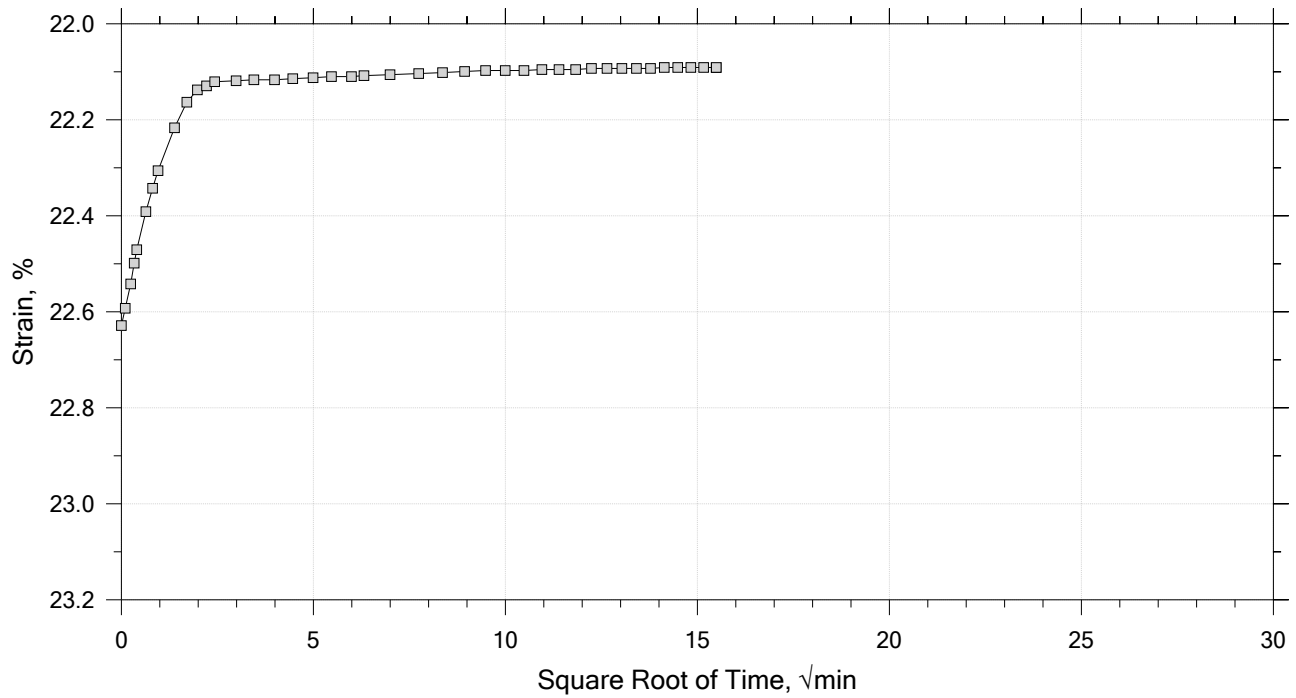
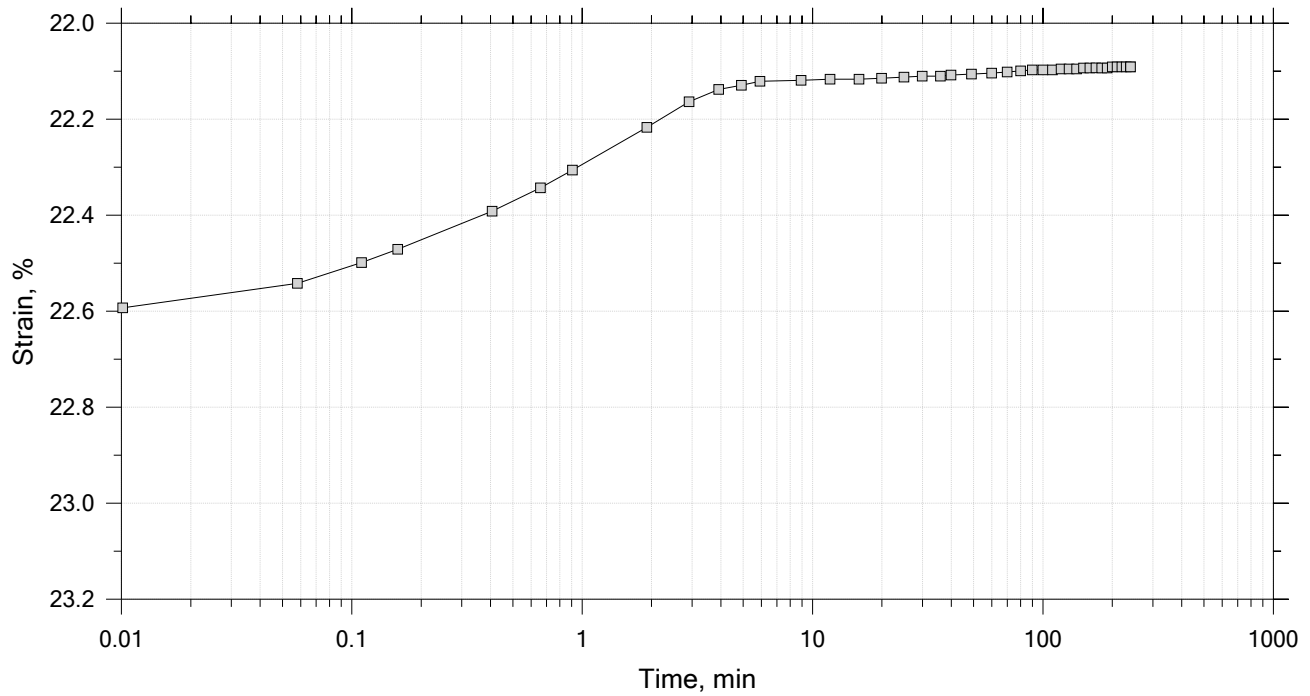
|                                                                                     |                                                      |                          |                         |
|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Howard Center                               | Location: Burlington, VT | Project No.: GTX-316555 |
|                                                                                     | Boring No.: ---                                      | Tested By: md            | Checked By: anm         |
|                                                                                     | Sample No.: B-3                                      | Test Date: 12/28/22      | Depth: 25-27 ft         |
|                                                                                     | Test No.: IP-1                                       | Sample Type: intact      | Elevation: ---          |
|                                                                                     | Description: Moist, brown clay with sand             |                          |                         |
|                                                                                     | Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf |                          |                         |
|                                                                                     |                                                      |                          |                         |

# One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 11 of 15

Constant Load Step

Stress: 8 tsf



|                                                                                     |                                                      |                          |                         |
|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Howard Center                               | Location: Burlington, VT | Project No.: GTX-316555 |
|                                                                                     | Boring No.: ---                                      | Tested By: md            | Checked By: anm         |
|                                                                                     | Sample No.: B-3                                      | Test Date: 12/28/22      | Depth: 25-27 ft         |
|                                                                                     | Test No.: IP-1                                       | Sample Type: intact      | Elevation: ---          |
|                                                                                     | Description: Moist, brown clay with sand             |                          |                         |
|                                                                                     | Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf |                          |                         |
|                                                                                     |                                                      |                          |                         |

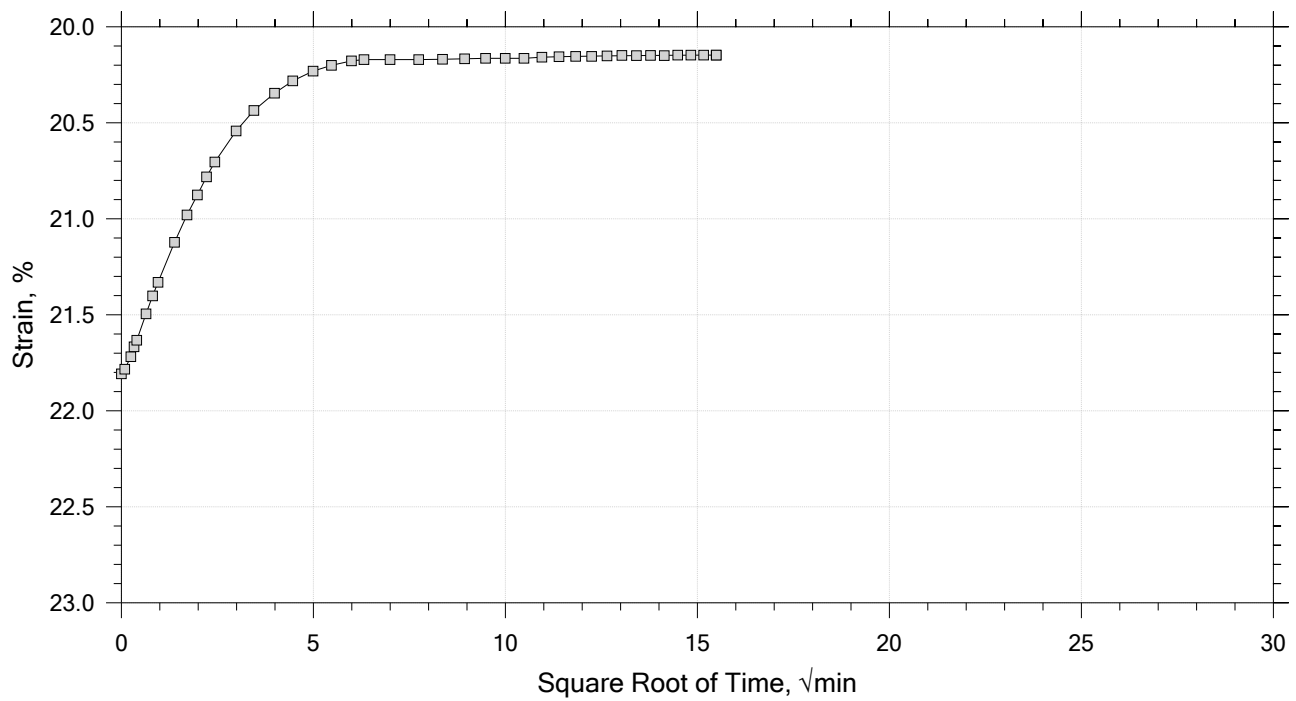
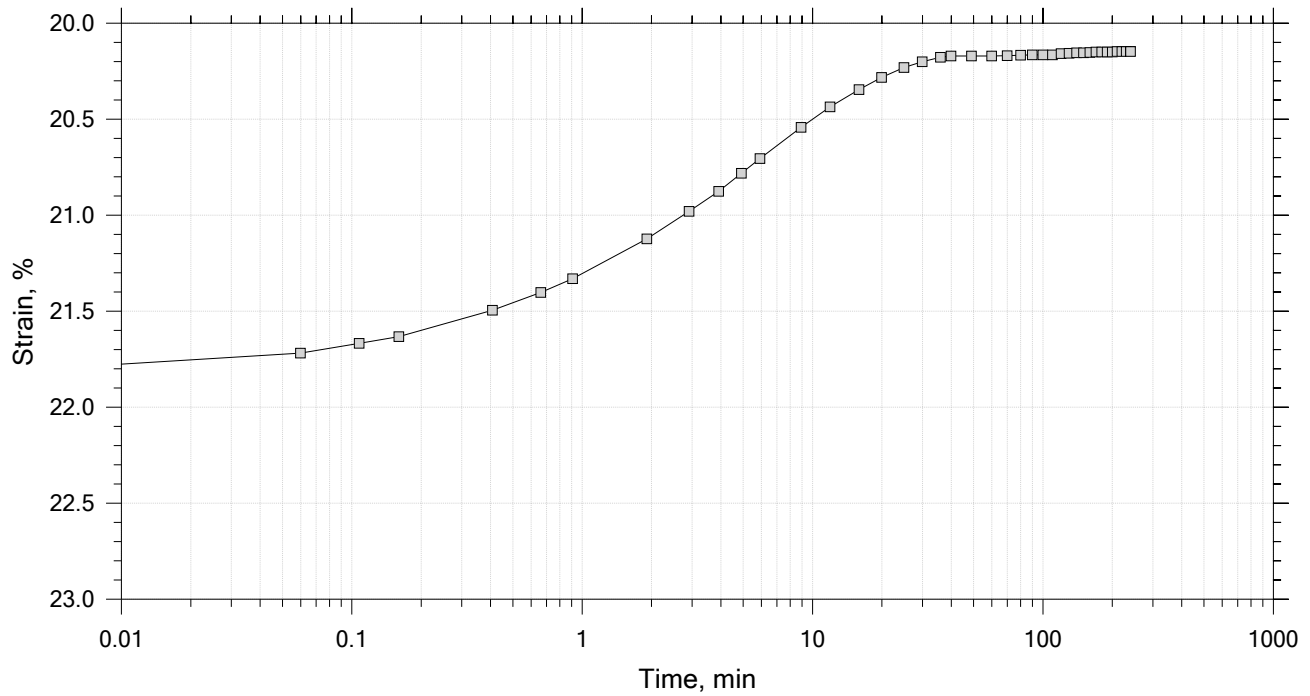


# One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 12 of 15

Constant Load Step

Stress: 2 tsf



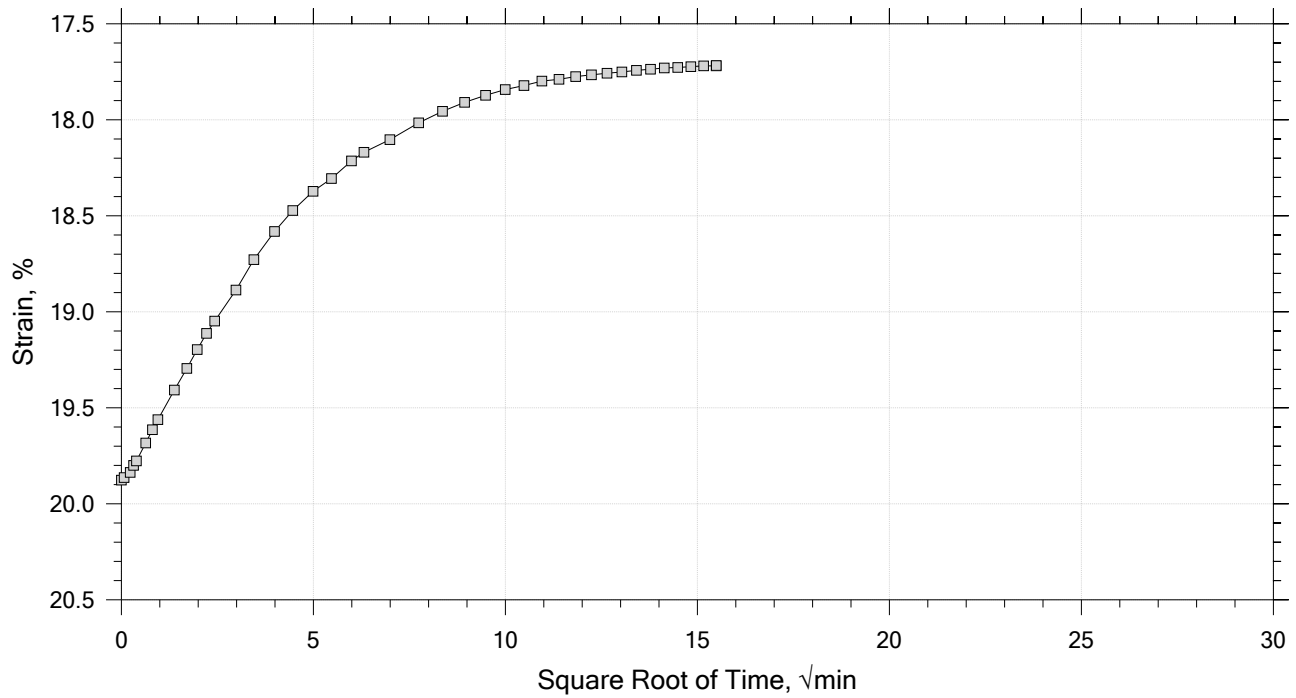
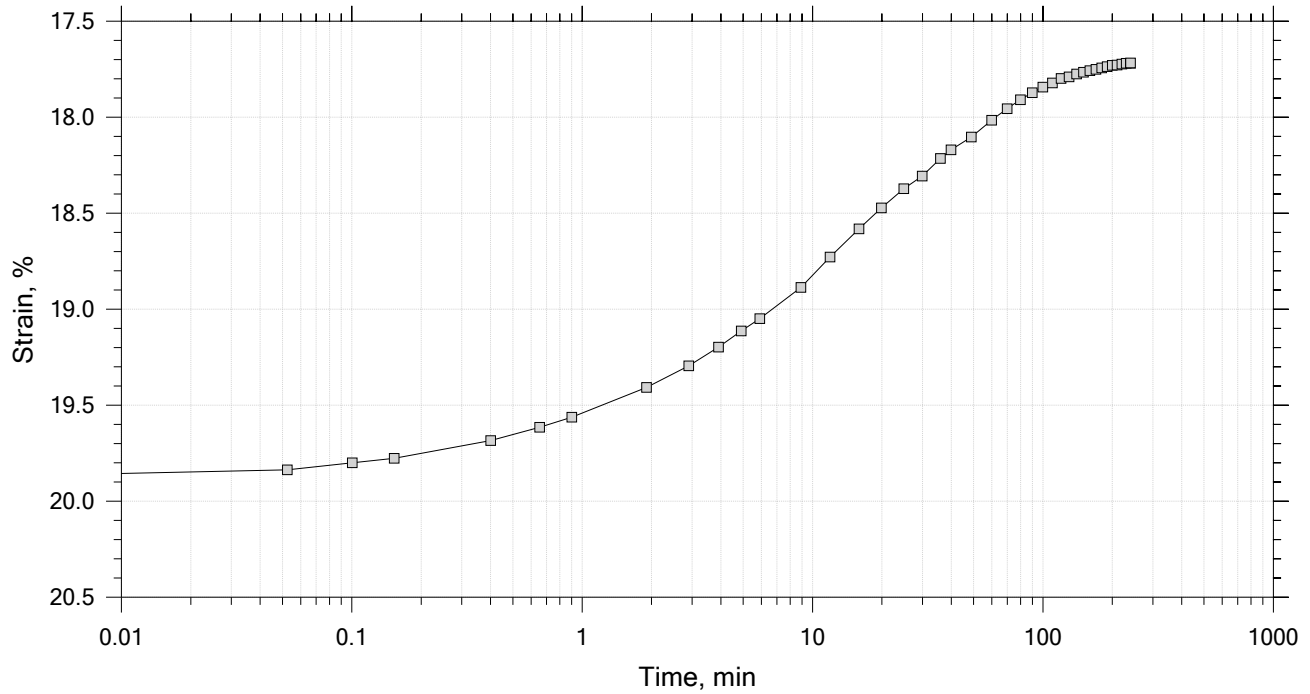
|                                                                                     |                                                      |                          |                         |
|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Howard Center                               | Location: Burlington, VT | Project No.: GTX-316555 |
|                                                                                     | Boring No.: ---                                      | Tested By: md            | Checked By: anm         |
|                                                                                     | Sample No.: B-3                                      | Test Date: 12/28/22      | Depth: 25-27 ft         |
|                                                                                     | Test No.: IP-1                                       | Sample Type: intact      | Elevation: ---          |
|                                                                                     | Description: Moist, brown clay with sand             |                          |                         |
|                                                                                     | Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf |                          |                         |
|                                                                                     |                                                      |                          |                         |

# One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 13 of 15

Constant Load Step

Stress: 0.5 tsf



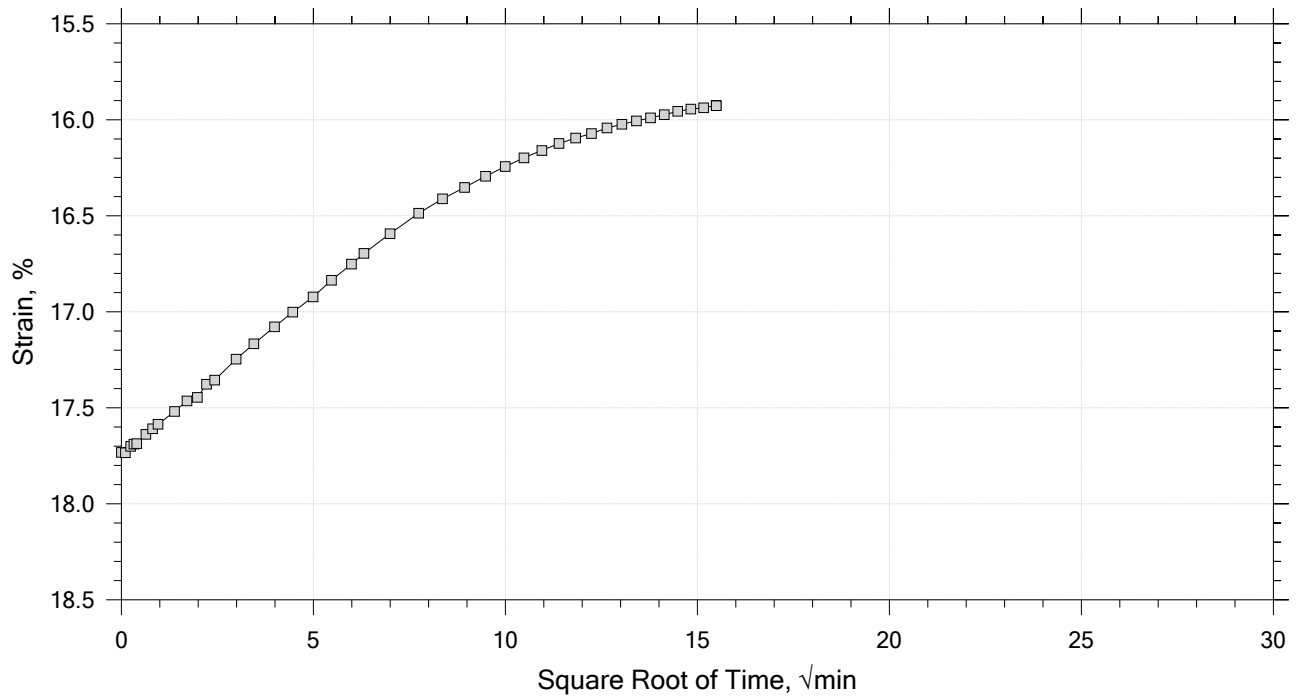
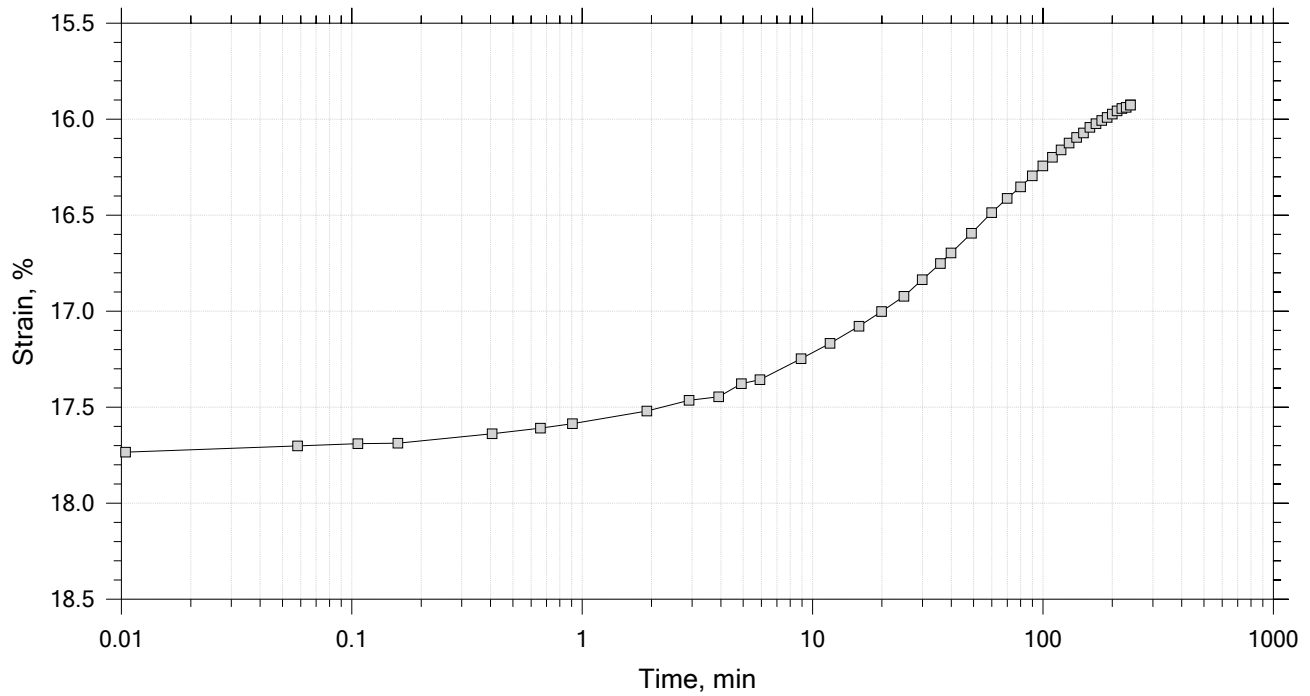
|                                                                                     |                                                      |                          |                         |
|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Howard Center                               | Location: Burlington, VT | Project No.: GTX-316555 |
|                                                                                     | Boring No.: ---                                      | Tested By: md            | Checked By: anm         |
|                                                                                     | Sample No.: B-3                                      | Test Date: 12/28/22      | Depth: 25-27 ft         |
|                                                                                     | Test No.: IP-1                                       | Sample Type: intact      | Elevation: ---          |
|                                                                                     | Description: Moist, brown clay with sand             |                          |                         |
|                                                                                     | Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf |                          |                         |
|                                                                                     |                                                      |                          |                         |

# One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 14 of 15

Constant Load Step

Stress: 0.125 tsf



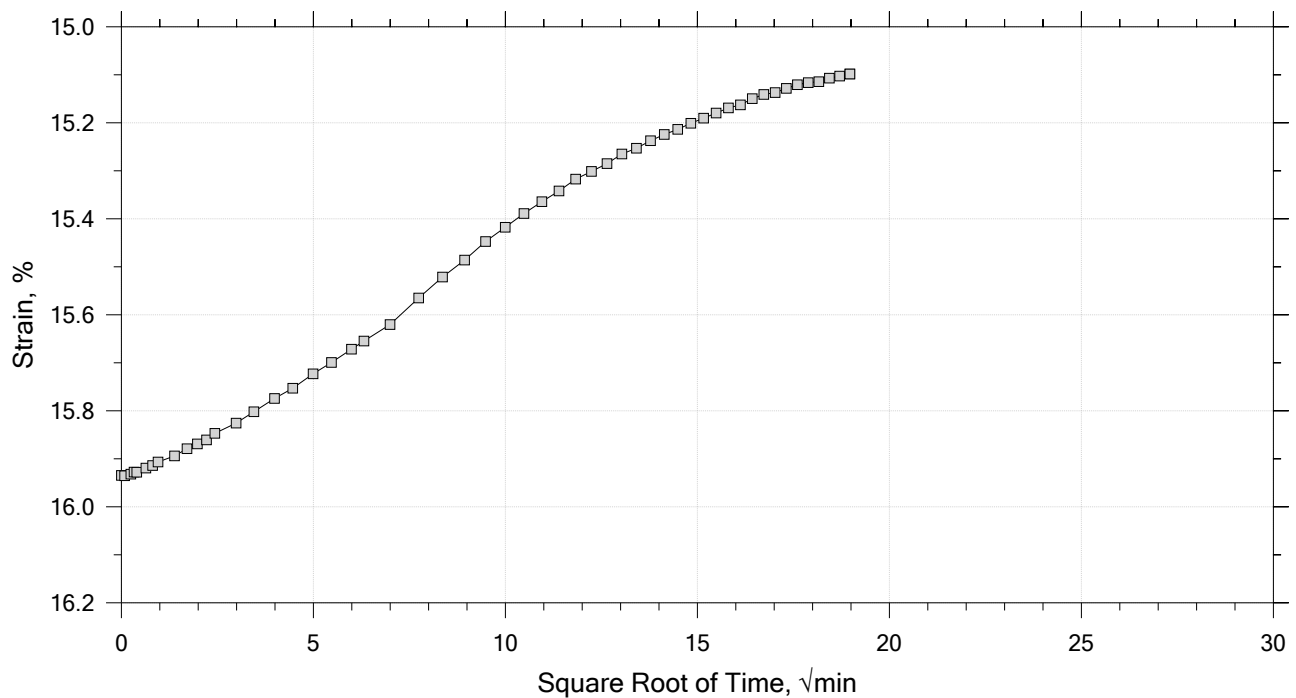
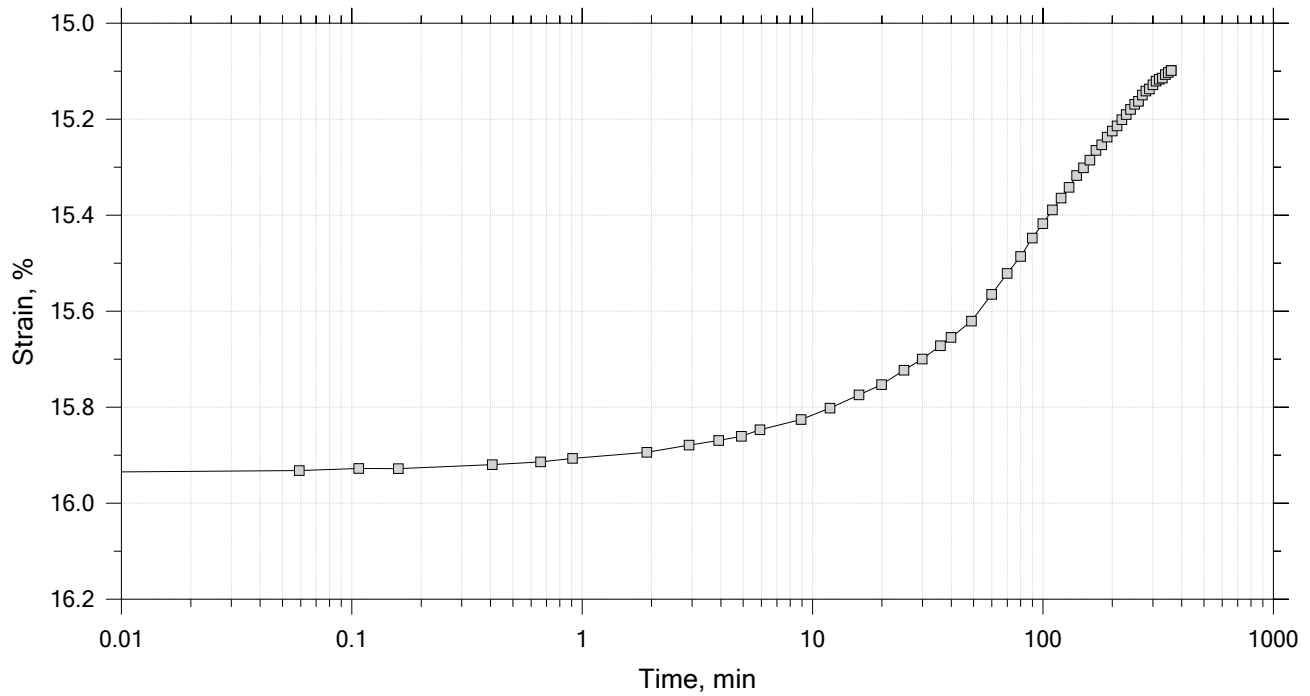
|                                                                                     |                                                      |                          |                         |
|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Howard Center                               | Location: Burlington, VT | Project No.: GTX-316555 |
|                                                                                     | Boring No.: ---                                      | Tested By: md            | Checked By: anm         |
|                                                                                     | Sample No.: B-3                                      | Test Date: 12/28/22      | Depth: 25-27 ft         |
|                                                                                     | Test No.: IP-1                                       | Sample Type: intact      | Elevation: ---          |
|                                                                                     | Description: Moist, brown clay with sand             |                          |                         |
|                                                                                     | Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf |                          |                         |
|                                                                                     |                                                      |                          |                         |

# One-Dimensional Consolidation by ASTM D2435 - Method B

Time Curve 15 of 15

Constant Load Step

Stress: 0.0625 tsf



|                                                                                     |                                                      |                          |                         |
|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Howard Center                               | Location: Burlington, VT | Project No.: GTX-316555 |
|                                                                                     | Boring No.: ---                                      | Tested By: md            | Checked By: anm         |
|                                                                                     | Sample No.: B-3                                      | Test Date: 12/28/22      | Depth: 25-27 ft         |
|                                                                                     | Test No.: IP-1                                       | Sample Type: intact      | Elevation: ---          |
|                                                                                     | Description: Moist, brown clay with sand             |                          |                         |
|                                                                                     | Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf |                          |                         |
|                                                                                     |                                                      |                          |                         |



# One-Dimensional Consolidation by ASTM D2435 - Method B

|                            |                                  |                       |
|----------------------------|----------------------------------|-----------------------|
| Specimen Diameter: 2.50 in | Estimated Specific Gravity: 2.73 | Liquid Limit: ---     |
| Initial Height: 1.00 in    | Initial Void Ratio: 0.783        | Plastic Limit: ---    |
| Final Height: 0.84 in      | Final Void Ratio: 0.498          | Plasticity Index: --- |

|                               | Before Test<br>Trimmings | Before Test<br>Specimen | After Test<br>Specimen | After Test<br>Trimmings |
|-------------------------------|--------------------------|-------------------------|------------------------|-------------------------|
| Container ID                  | E-5371                   | RING                    |                        | E3727                   |
| Mass Container, gm            | 8.63                     | 111.23                  | 111.23                 | 8.33                    |
| Mass Container + Wet Soil, gm | 190.71                   | 269.6                   | 257                    | 155.45                  |
| Mass Container + Dry Soil, gm | 152.15                   | 234.55                  | 234.55                 | 132.79                  |
| Mass Dry Soil, gm             | 143.52                   | 123.32                  | 123.32                 | 124.46                  |
| Water Content, %              | 26.87                    | 28.42                   | 18.21                  | 18.21                   |
| Void Ratio                    | ---                      | 0.78                    | 0.50                   | ---                     |
| Degree of Saturation, %       | ---                      | 99.23                   | 100.00                 | ---                     |
| Dry Unit Weight, pcf          | ---                      | 95.705                  | 113.93                 | ---                     |

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

|                                                                                     |                                                      |                          |                         |
|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Howard Center                               | Location: Burlington, VT | Project No.: GTX-316555 |
|                                                                                     | Boring No.: ---                                      | Tested By: md            | Checked By: anm         |
|                                                                                     | Sample No.: B-3                                      | Test Date: 12/28/22      | Depth: 25-27 ft         |
|                                                                                     | Test No.: IP-1                                       | Sample Type: intact      | Elevation: ---          |
|                                                                                     | Description: Moist, brown clay with sand             |                          |                         |
|                                                                                     | Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf |                          |                         |
|                                                                                     |                                                      |                          |                         |
|                                                                                     |                                                      |                          |                         |

## One-Dimensional Consolidation by ASTM D2435 - Method B

### Square Root of Time Coefficients

[illegible]

|                                                                                     |                                                      |                          |                         |
|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------|-------------------------|
|  | Project: Howard Center                               | Location: Burlington, VT | Project No.: GTX-316555 |
|                                                                                     | Boring No.: ---                                      | Tested By: md            | Checked By: anm         |
|                                                                                     | Sample No.: B-3                                      | Test Date: 12/28/22      | Depth: 25-27 ft         |
|                                                                                     | Test No.: IP-1                                       | Sample Type: intact      | Elevation: ---          |
|                                                                                     | Description: Moist, brown clay with sand             |                          |                         |
|                                                                                     | Remarks: System LTIII-H, Swell Pressure = 0.0646 tsf |                          |                         |
|                                                                                     | Displacement at End of Increment                     |                          |                         |

## APPENDIX G: SITE PHOTOGRAPHS

## PHOTO LOG

|                              |                                                 |
|------------------------------|-------------------------------------------------|
| John Turner Consulting, Inc. | Site Location: 300 Flynn Avenue, Burlington, VT |
|------------------------------|-------------------------------------------------|

| Photo No.<br>1                                                                    | Date:<br>12/12/2022 |
|-----------------------------------------------------------------------------------|---------------------|
|  |                     |
| Description: B-57 Truck Mounted Drilling Rig                                      |                     |

| Photo No.<br>2                                                                     | Date:<br>12/12/2022 |
|------------------------------------------------------------------------------------|---------------------|
|  |                     |
| Description: B-1 (10-12 Feet)                                                      |                     |

| Photo No.<br>3                                                                      | Date:<br>12/12/2022 |
|-------------------------------------------------------------------------------------|---------------------|
|  |                     |
| Description: B-3 (20-22 Feet)                                                       |                     |

| Photo No.<br>4                                                                       | Date:<br>12/12/2022 |
|--------------------------------------------------------------------------------------|---------------------|
|  |                     |
| Description: B-4 (10-12 Feet)                                                        |                     |



Figure 2. Locations and Drainage Areas of BMPs Considered in Developing Englesby Brook FRP

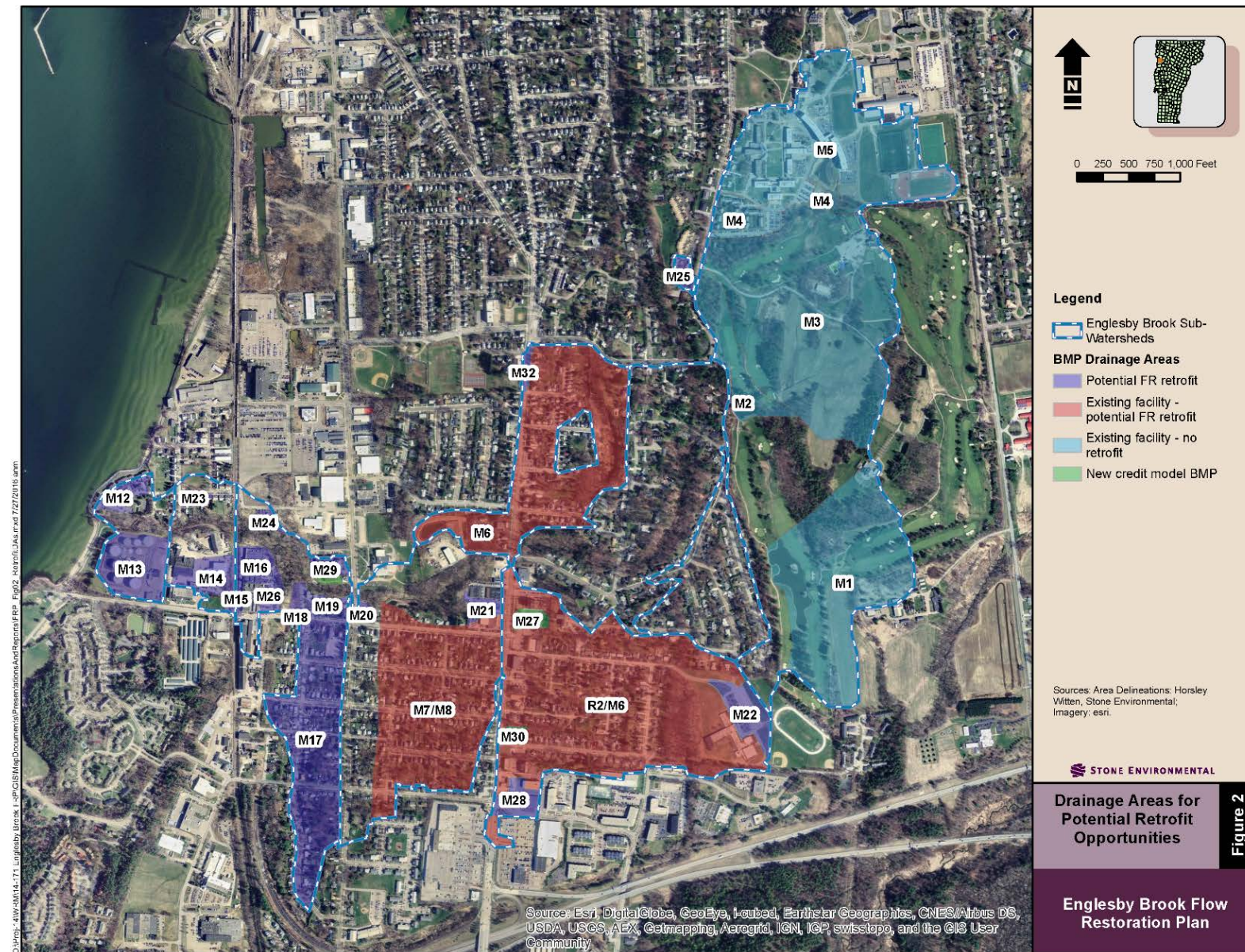


Table 7: Summary of BMPs Included in Englesby Brook Flow Restoration Scenario.

| Site ID        | Site Name                     | BMP Type                      | Model Scenario | DA (ac) | IA (ac) | % Difference in Q03 <sup>1</sup> |                         | Detention Time <sup>4</sup> (min) |
|----------------|-------------------------------|-------------------------------|----------------|---------|---------|----------------------------------|-------------------------|-----------------------------------|
|                |                               |                               |                |         |         | BMP <sup>2</sup>                 | Water-shed <sup>3</sup> |                                   |
| M1             | BCC Lower Pond                | Wet Basin                     | Base/ Credit   | 43.40   | 1.28    | -6.7                             | -3.0                    | 997                               |
| M2             | BCC Upper Pond 2              | Wet Basin                     | Base/ Credit   | 9.34    | 0.54    | -0.2                             | 0.7                     | 33                                |
| M3             | BCC Upper Pond 1              | Wet Basin                     | Base/ Credit   | 67.94   | 5.60    | -0.1                             | 0.0                     | 17                                |
| M4             | Catamount Lower Pond          | Wet Basin                     | Base/ Credit   | 7.46    | 3.36    | -37.5                            | -1.6                    | 517                               |
| M5             | Catamount Upper Pond          | Wet Basin                     | Base/ Credit   | 45.23   | 20.61   | -46.3                            | -8.5                    | 843                               |
| M6B (M10)      | Englesby 08 Pond Retrofit     | Wet Basin                     | Credit/FRP     | 129.76  | 48.55   | -63.4                            | -36.9                   | 721                               |
| M7/M8/M9       | Englesby SM6 Ponds            | Forebay/ 2 Wet Basins         | Credit         | 44.09   | 19.52   | 3.5                              | 0.05                    | 47                                |
| M17            | 288 Flynn Ave/ Champlain Pkwy | Dry Basin                     | FRP            | 30.77   | 13.07   | -49.4                            | -5.1                    | 763                               |
| M18            | 208 Flynn Ave Coop            | Dry Basin                     | FRP            | 0.42    | 0.30    | -66.7                            | 0.0                     | 758                               |
| M19            | Pine St. Counseling Ctr.      | Dry Basin                     | FRP            | 0.80    | 0.48    | -50.0                            | -0.1                    | 704                               |
| M25            | Overlake Condos               | Dry Basin                     | FRP            | 1.19    | 0.73    | -62.5                            | -0.8                    | 647                               |
| V27/M27A/ M27B | Hickok & Boardman             | Swale/Wet Pond/Infil. Chamber | Credit         | 1.29    | 0.92    | -100.0                           | -0.9                    | 55                                |
| M29            | Champlain Co-op               | Dry Basin                     | FRP            | 1.59    | 1.09    | -57.1                            | -0.6                    | 847                               |
| M30            | Pizzagalli Properties         | Permeable Pavement            | Credit         | 0.64    | 0.58    | -100.0                           | -0.3                    | 360                               |
| M31            | 847 Pine St.                  | Dry Basin                     | Credit         | 0.45    | 0.23    | -100.0                           | -0.1                    | 101                               |

<sup>1</sup> Percent difference in high flows is negative when showing a reduction. The model was run with all BMPs turned on and then with individual BMPs turned off, one at a time, to quantify differences in flow and relative performance.

<sup>2</sup> Differences at each BMP were determined by comparing the inflows and outflows in the BMP. 100% represents no surface discharge; BMPs with less than 50% at the BMP outlet could be opportunities to enhance performance.

<sup>3</sup> Differences in flow at the watershed outlet are intended as a relative comparison of BMP effectiveness, but are not absolute or additive. Individual BMP values do not add up to corresponding total watershed reductions due to other losses in the system.

<sup>4</sup> Detention times are restricted to ~12 hrs (720 mins) per cold water fisheries requirements.



Figure 3: Englesby Brook Watershed Areas Receiving Treatment in the Flow Restoration Scenario

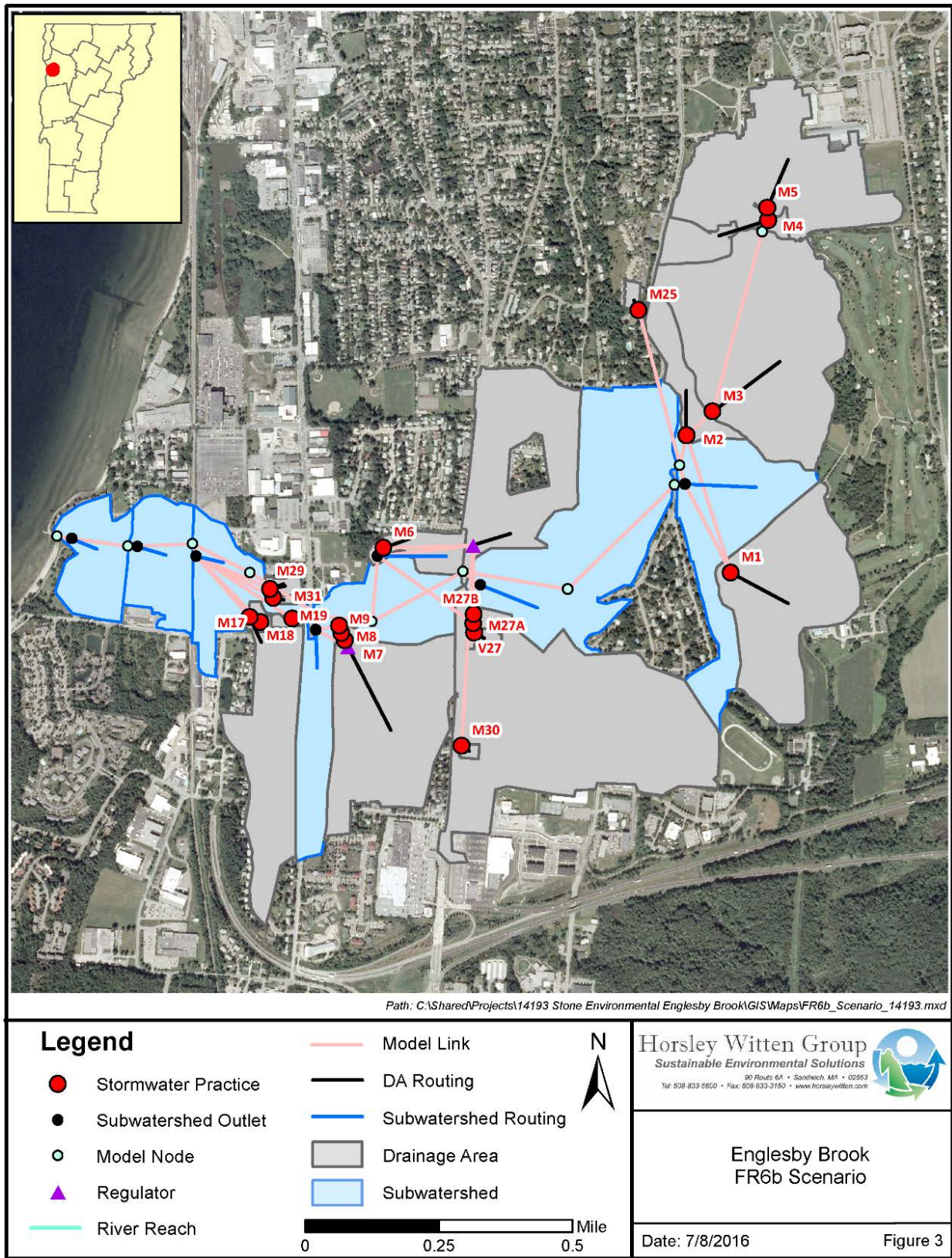


Table 8: Proposed Priority BMP Cost Estimates.

| BMP ID       | Site Name                     | Storage Volume<br>(cf) | Total Cost (\$)  | Impervious Area (ac) | Cost per Impervious Acre |
|--------------|-------------------------------|------------------------|------------------|----------------------|--------------------------|
| M10          | O8 Pond retrofit <sup>1</sup> | 136,061                | \$360,850        | 48.55                | \$7,433                  |
| M17          | 288 Flynn Ave/ Champlain Pkwy | 74,201                 | \$385,500        | 13.07                | \$29,495                 |
| <b>TOTAL</b> |                               |                        | <b>\$746,350</b> | <b>61.62</b>         |                          |

<sup>1</sup> This is an expansion of an existing practice which increases available storage and optimizes detention; costs reflect only the incremental cost of the retrofit.

## 5.2. Spreadsheet Cost Estimates

Estimating costs for implementing BMP retrofits for sites with expired permits utilized a somewhat less robust approach. Cost estimates were calculated as a base construction cost plus a 30% contingency factor for final design and permitting. The base cost was estimated on a unit cost basis, using a specified design volume (cu. ft.) multiplied by a unit cost (\$/cu. ft.). Unit costs were calculated based on the memorandum from Tetra Tech, Inc. dated October 30, 2007. These rates use a 2000 base year and have been updated to account for inflation to the year 2016, using a 2.5% inflation rate. The costs are calculated based on the following equation:

$$\text{total cost} = \text{installation cost (I)} + \text{land cost (L)} + \text{fixed cost (F)}$$

Where:

I = \$6/cf of infiltration, inflated at 2.5% to year 2016 = \$8.70/cf

L = \$0 as it is not anticipated that property will be required to be purchased

F = design/permitting costs (30% of I)

The anticipated costs associated with implementing the expired permit BMP retrofits, as identified in Table 7 as part of the Flow Restoration Scenario, are presented below in Table 9. Although all of these projects would be located on private land, no cost has been assigned for land acquisition.

Table 9: Proposed Expired Permit BMP Retrofit Cost Estimates.

| BMP ID       | Site Name                    | Treatment Volume<br>(cf) | I (\$)   | F (\$)   | Total Cost (\$)  | Impervious Area<br>(ac) | Cost per Impervious Acre |
|--------------|------------------------------|--------------------------|----------|----------|------------------|-------------------------|--------------------------|
| M18          | 208 Flynn Ave Coop           | 1,370                    | \$11,919 | \$3,576  | \$15,495         | 0.30                    | \$51,649                 |
| M19          | Pine St Counseling Ctr       | 2,349                    | \$20,436 | \$6,131  | \$26,567         | 0.48                    | \$55,348                 |
| M25          | Overlake Condos              | 3,537                    | \$30,772 | \$9,232  | \$40,004         | 0.73                    | \$54,799                 |
| M29          | Champlain Co-op <sup>1</sup> | 5,089                    | \$55,343 | \$16,603 | \$71,946         | 1.09                    | \$66,005                 |
| <b>TOTAL</b> |                              |                          |          |          | <b>\$154,011</b> | <b>2.60</b>             |                          |

<sup>1</sup> Any BMP at this location will likely need to be subsurface, and therefore the assumed unit cost per cf treated was increased by 25%.



ID#: M19

**Name:** Pine Street Counseling Center**Concept Description:**

Install dry basin or possibly bioretention area in north central area of lot to capture flows from roof and parking areas.

**Notes/Feasibility:**

Expired permit 1-0337

**GENERAL SITE INFORMATION****RETROFIT DETAILS****Site Contact Info:****Project Candidate:** 1<sup>st</sup> tier**Ownership:****Retrofit of new or existing BMP:** New**Land Use Type:****Proposed Retrofit Practice 1:** Dry basin**Land Use Detail:****Proposed Retrofit Practice 2:** Bioretention**Existing BMP on Site?****Non-Structural Controls:****Is site a hotspot?****Non-Structural Other:****Sources/pollutants:****Maintenance Burden:** moderate**Soils:****Benefits:**

Storage: Y  
Water Quality: Y  
Recharge: M  
Demonstration: N  
Repair: N  
Reuse: N

**Conflicts:**

Soils:  
Access:  
Land Use:  
Utilities:  
Polluted:  
High WT:  
Wetlands:  
**Other:**

**Use in Retrofit DA:****SIZING INFORMATION****Drainage Area (ac):** 0.80**Impervious Area (ac):** 0.48**Practice Area Available (ft<sup>2</sup>):** 1750**Existing Head Available?** Y**Date:** 04/10/15**Assessed by:** JSM

March 29, 2016

To: Megan Moir, CPESC, CPSWQ

From: Julie Moore, PE

Stone Project No. 16-030

Subject: Englesby Watershed Expired Stormwater Permit Review

# MEMO

Stone completed a field assessment of each of the five systems in the Englesby Brook watershed with expired stormwater permits. These systems are identified in Table 1, below.

*Table 1: Expired Stormwater Permits in the Englesby Brook Watershed*

| Permit Number | Project Name                  | Permit Issued |
|---------------|-------------------------------|---------------|
| 1-0337        | Howard Mental Health Services | 3/4/1982      |
| 1-1087        | Flynn Ave Coop Housing        | 9/15/1992     |
| 2-0789        | Overlake Condominiums         | 11/24/1988    |
| 2-0999        | Champlain Apartments          | 4/20/1982     |
| 2-1052        | Crescent Terrace              | 12/20/1985    |

In general, the permits are written rather broadly with few enforceable items and typically focus on curb-and-gutter system elements, including catch basins. Further, the site plans available in the permit files tend to lack the specificity and level of detail provided for systems constructed post-2002. A brief summary of our observations is provided below, including recommendations for completing any actions that would be required to bring the facilities into compliance.

## **1-0337, Howard Mental Health Services, 300 Flynn Ave.**

Permit covers the discharge of roof drainage via “stone lined ditch in natural drainage swale” to Englesby Brook; parking lot runoff does not appear to be regulated under the permit. During the site visit we found that the stone lined ditch is not well defined. The majority of flow leaving the site and discharging to Englesby Brook appears to occur via subsurface drain pipes not included in the permit; four outfalls were identified during the site visit that are not included in the City’s stormwater GIS layer, including one of which appears to divert water directly from Pine Street. In order to bring this facility into compliance with its existing permit, the stone lined ditch would need to be improved. In addition, the source of the water draining to each of the subsurface drains should be confirmed. As part of the Englesby Brook Flow



Restoration Plan (FRP), a potential retrofit was identified for managing runoff from parking lots draining to the existing green space behind 300 Flynn Ave.

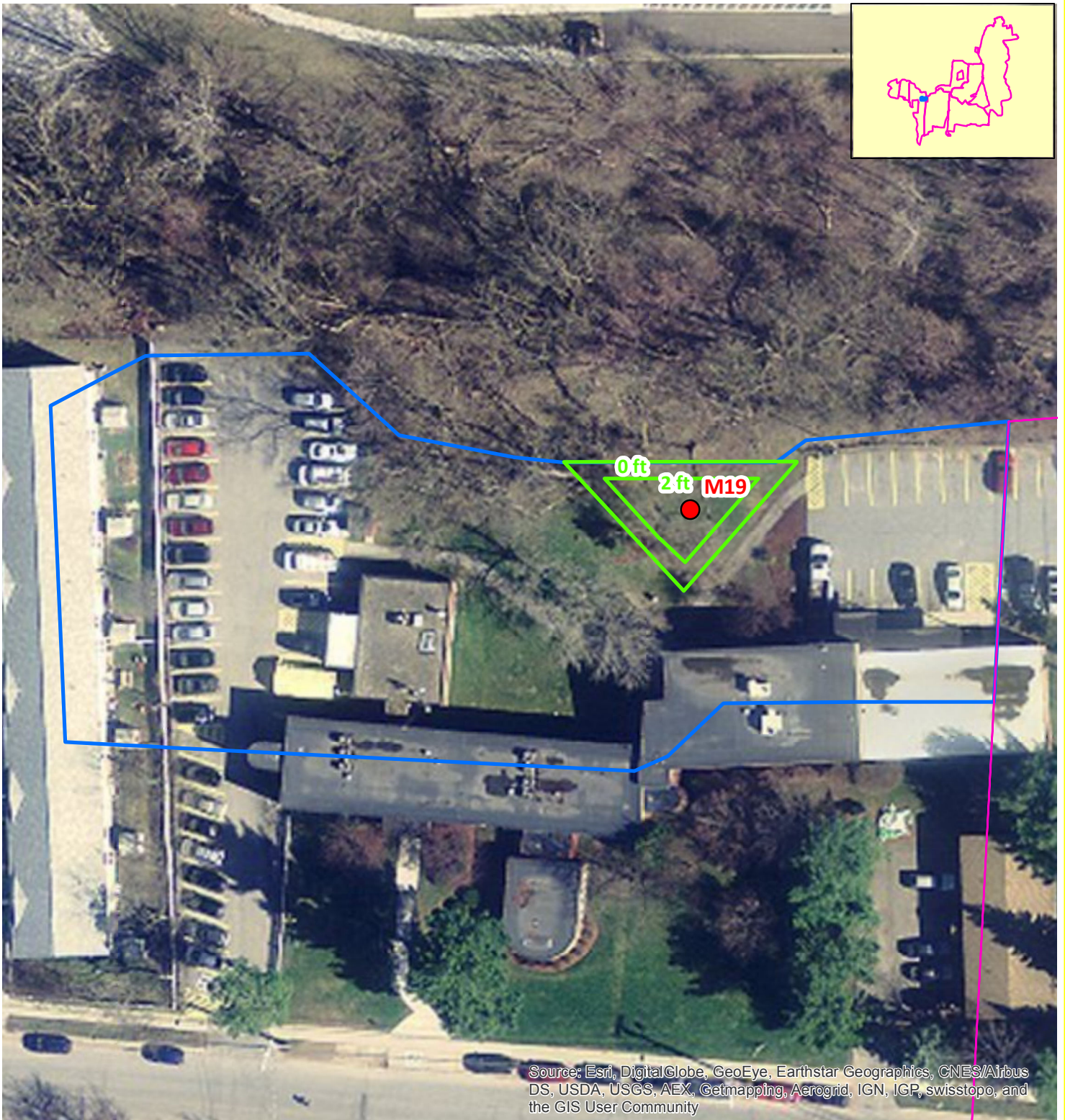
Photo 1: Presumed Location of Natural Drainage Swale and Unknown Subsurface Drainage Outlet



#### **1-1087, Flynn Ave Coop Housing, 288 Flynn Ave**

Permit covers the discharge of stormwater runoff from roofs and paved parking lots following treatment “via grass-lined swales, through rip-rapped areas at the top of bank of Englesby Ravine, and via overland flow across vegetated terrain...” During the site visit we found that there are grass-lined to the north of the apartment complex which appear to convey stormwater runoff to rip-rapped areas that lead down to the ravine. We also noted during our site visit that the parking lot catch basin indicated in the City’s stormwater GIS layer does not exist. This site was generally found to be in compliance with its permit. As part of the Englesby Brook FRP, a significant potential retrofit was identified for in the green space immediately to the west of 288 Flynn Ave. and to the east of the proposed Champlain Parkway alignment.





Path: \\CIFS1\netdrv-o\Proj-14\WRM\14-171 Englesby Brook FRP\GIS\MapDocuments\PpresentationsAndReports\VR\_concepts\Englesby\_Concept\_14193\_M19.mxd

## Legend

- Proposed M19 BMP
- Proposed M19 Depth Contours
- Proposed M19 Drainage Area
- Sub-watersheds



0 25 50 Feet

Horsley Witten Group  
Sustainable Environmental Solutions

90 Route 6A • Sandwich, MA • 02563  
Tel: 508-833-6600 • Fax: 508-833-3150 • www.horsleywitten.com



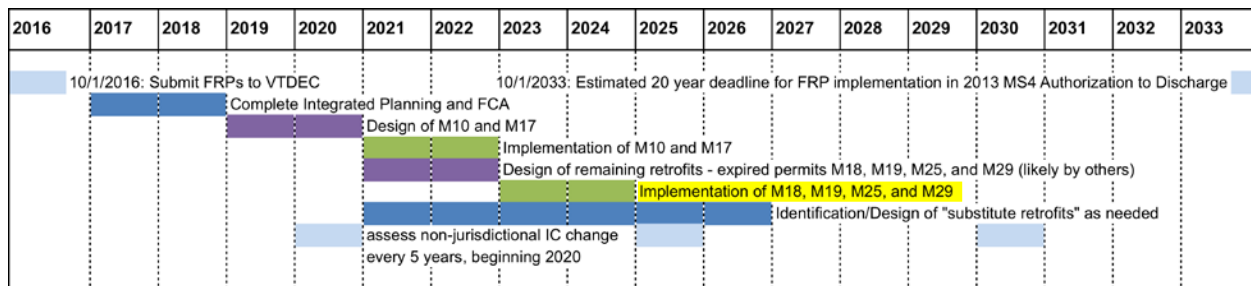
M19 Concept Design

Date: 7/29/2016

Figure C.3



## APPENDIX E: DESIGN AND CONSTRUCTION SCHEDULE



## Department of Permitting and Inspections

Zoning Division

645 Pine Street

Burlington, VT 05401

<https://www.burlingtonvt.gov/DPI/Zoning-Permits>

Telephone: (802) 865-7188

(802) 865-7195 (FAX)

William Ward, Director  
Theodore Miles, Code Compliance Officer  
Scott Gustin, AICP, CFM, Principal Planner  
Mary O'Neil, AICP, Principal Planner  
Garret King, Associate Planner  
Joseph Cava, Planning Technician  
Ted Boylan, Permit Administrator



## MEMORANDUM

To: Development Review Board

From: Mary O'Neil, AICP, Principal Planner

Date: October 17, 2023

RE: ZP-23-398; 300 Flynn Avenue

**Note: These are staff comments only. Decisions on projects are made by the Development Review Board, which may approve, deny, table or modify any project. THE APPLICANT OR REPRESENTATIVE MUST ATTEND THE MEETING.**

**File:** ZP-23-398

**Location:** 300 Flynn Avenue

**Zone:** NMU **Ward:** 5

**Parking District:** MMMU

**Date application accepted:** August 19, 2023

**Applicant/ Owner:** Joe Weith, White + Burke / Howard Center for Human Services Inc.

**Request:** Proposed demolition of existing 24,042 square foot building to construct a new 50,100 square foot building for mental health crisis center and related medical/general office uses.



**Background:**

- **Zoning Sketch Plan Review ZSP-23-3;** demolish the existing 24,000 square foot building and construct a new 51,000 square foot building for mental health crisis center use. May 2023.
- **Non-applicability of Zoning Permit Requirements 15-0667NA;** sign panel replacement to accommodate updated logo. December 2014.
- **Non-applicability of Zoning Permit Requirements 16-1198NA;** repave walkway. May 2016.
- **Zoning Permit 16-0214CA;** remove older shed and replace with new, larger shed. September 2015.
- **Non-applicability of Zoning Permit Requirements 14-1036NA;** replace fence. May 2014.
- **Zoning Permit 13-0324CA;** replace eight existing AC condensing units with new units and install one exterior wall vent. September 2012.
- **Zoning Permit 08-317SN;** replacement freestanding sign for Howard Mental Health. October 2007.
- **Non-applicability of Zoning Permit Requirements 10-0147NA;** replace side walk. August 2009.
- **Zoning Permit 11-191;** entry door renovations to the existing mental health facility that include replacing with sliding doors and protective canopy with relocated nonilluminated parallel sign. Proposal includes construction of a wall to protect the existing exterior stair and replacement of the existing brick façade with T1-11 in a section of the north façade. No change in structural capacity. October 1999.
- **Zoning Permit 97-553 / COA 097-082;** installation of three bus shelters, one at Howard Mental Health on Pine Street frontage. June 1997.
- **Zoning Permit 93-514;** replace existing freestanding and parallel sign in same location, size and illumination for community mental health center with new name. June 1993.
- **Zoning Permit 93-442;** replace existing entry step with covered deck measuring 10 x 18' with roof to match existing. Use remains Howard Relief Services. May 1993.
- **Zoning Permit 87-540;** remove approximately 450 sq. ft. of walkway and replace with approximately 460 sf. of walkway in an alternate location. October 1987.
- **Zoning Permit 84-132;** add two windows and a door to the west elevation of the building to accommodate a new entryway into the building. Replace the existing walkway into the building with one of the same dimensions in the new location. April 1984.

- **Zoning Permit 76-208;** install two new exterior doors and exit way and relocate one exterior door on the building. May 1975.
- **Notice of Public Hearing (Burlington Board of Aldermen) November 25, 1974.**  
Appeal of the Howard Mental Health Services, in anticipation of rezoning this area at 300 Flynn Avenue to permit Howard Mental Health Services to occupy and use the building presently known as St. Anthony's Convent for a semi-public use as soon as possible to carry out its services to the community.
- **Letter by Board of Adjustment;** Notice to Reverend Edmund Marion advising application to the Board of Aldermen to revise the Zoning Ordinance so that the property opposite [your] church be included in Zone 1 rather than Zone 4 so that a use harmful and objectionable to [your] church may not occur. June 2, 1947.

### Overview:

Howard Center is proposing to redevelop their property located at 300 Flynn Avenue. The 300 Flynn Redevelopment project will involve demolition of the existing approximately 24,042 square foot building and construction of a new 3 story, approximately 50,100 square foot building. The current and proposed use of the property is a combination of mental health crisis center and related medical and general office uses. Mental health crisis center is a conditional use in the underlying zoning district.

The applicant is also requesting an adjustment in the time limits typically applied to a zoning permit: They request the following:

1. The zoning permit shall become invalid unless work on the project commences on or before April 1, 2026; and
2. All work on the project shall be completed, and a Final Zoning Certificate of Occupancy received, on or before October 1, 2027.



The **Design Advisory Board** reviewed the application at their September 12, 2003 meeting and voted unanimously to offer a recommendation of approval to the DRB.

**Recommended motion:**  
**Contingent upon DRB approval of the requested Time Limit revision, Conditional Use and Certificate of Appropriateness Approval,** per the following Findings and Conditions:



## **I. Findings**

### **Article 3: Applications, Permits and Project Reviews**

#### **Section 3.2.9 Zoning Permits**

##### **(d) Time Limit on Permits**

*Notwithstanding € and (f) below, a zoning permit shall become invalid unless the work or action authorized commences within one (1) year after the date of final decision. All work or action authorized there under shall be completed, and a Final Zoning Certificate of Occupancy received, within three (3) years of the date of decision unless a written extension of time not to exceed one (1) year is granted in advance by the administrative officer. Extensions of time for a zoning permit issued in connection with a conditional use or variance shall require approval by the DRB after a public hearing. Extensions of time may be granted only when the work or action authorized under the zoning permit remains compliant with the current zoning regulations. Up to two (2) time extensions may be granted.*

##### **(e) Time Limit on Zoning Permits: Violations:**

*Not applicable.*

##### **(f) Exceptions to Permit Time Limits:**

*Except for projects subject to additional state or federal permitting jurisdiction, or which have been appealed to Vermont Environmental Court pursuant to the requirements of Article 12, there shall be no exceptions to the time limits specified in Section 3.2.9 (d) and € unless longer or shorter time limits are specifically imposed as permit conditions of approval by the DRB at the time of approval.*

The applicant requests the following:

1. The zoning permit shall become invalid unless work on the project commences on or before April 1, 2026; and
2. All work on the project shall be completed, and a Final Zoning Certificate of Occupancy received, on or before October 1, 2027.

This is roughly an 18 month extension from both permit time periods (commencement and completion), and is at the discretion of the DRB. **Affirmative finding should DRB concur with request.**

### **Part 2: Applications and Permits**

#### **(b) Technical Review Committee**

The applicant's representatives appeared at the February 9, 2023 TRC meeting.

#### **(c) Sketch Plan Review**

Sketch Plan Review was held May 16, 2023.

#### **(d) Pre-application Neighborhood Meeting**

The applicant team met with the Ward 5 NPA December 15, 2022.

### **Part 3: Impact Fees**

The 300 Flynn Redevelopment project will involve demolition of existing 24,042 square foot building to construct a new 50,100 square foot building. Impact fees will be assessed for any net new building gross area. Assuming 26,058 net new area, the following is an estimate of the Impact Fees:

**Impact Fee**

**calculation**

**300 Flynn Avenue ZP-23-398**

SF of  
Project **26,058**

**FY 24: July 1, 2023 - June 30, 2024**

| Department   | Offices & Other |                     |
|--------------|-----------------|---------------------|
|              | Rate            | Fee                 |
| Traffic      | <b>0.795</b>    | 20,713.53           |
| Fire         | <b>0.234</b>    | 6,098.54            |
| Police       | <b>0.412</b>    | 10,746.32           |
| Parks        | <b>0.493</b>    | 12,841.85           |
| Library      | <b>0.000</b>    | 0.00                |
| Schools      | <b>0.000</b>    | 0.00                |
| <b>Total</b> | <b>1.934</b>    | <b>\$ 50,400.24</b> |

**Affirmative finding as conditioned.**

**Section 3.3.8: Time and Place of Payment**

*(a) New buildings: Impact fees must be paid at least seven days prior to occupancy of a new building or any portion thereof.*

**Affirmative finding as conditioned.**

**Part 5: Conditional use and Major Impact Review**

**Section 3.5.2 Applicability**

*(a) Conditional use Review*

Office use / Medical is a permitted use in the NMU zoning district. Mental Health Crisis Center is a Conditional Use per Section 5.4.11. (Technical error in Appendix A, which is scheduled for correction.)

*(b) Major Impact Review*

Threshold: *A development footprint of 20,000 sf or more, or the creation of 40,000 sf or more of gross floor area.*

**Section 3.5.3 Exemptions**

*(c) Projects that do not result in a change of use or increased parking demand.*

The use is not changing, but expanding. With the adoption of ZA 22-07, there are no longer minimum parking requirements. The review is exempt from Major Impact. **Affirmative finding.**

### Section 3.5.6 Review Criteria

#### (a) Conditional use Review Standards

*Approval shall be granted only if the DRB, after public notice and public hearing, determines that the proposed conditional use and associated development shall not result in an undue adverse effect on each of the following general standards:*

1. *Existing or planned public utilities, facilities or services are capable of supporting the proposed use in addition to the existing uses in the area;*

Aside from technical recommendations from Public Works relative to connection to existing infrastructure, the proposal will not introduce any identified adverse impacts on public utilities, facilities or services in the area. **Affirmative finding.**

2. *The character of the area affected as defined by the purpose or purposes of the zoning district(s) within which the project is located, and specifically stated policies and standards of the municipal development plan;*

This is a Neighborhood Mixed Use District; intended to have a diverse offering of public and private infrastructure. Support within PlanBTV includes:

- *Coordinate land use and development with the availability and capacity of public services, facilities and utilities to ensure a high level of service.* [Burlington as a Dynamic City, p. 49]
- *Government that is responsive to residents' needs* [Burlington as an Inclusive City, p. 57.]
- *Monitor community-wide needs for emergency shelters and treatment facilities and identify potential changes to enable those services in accessible locations for residents who need them* [Burlington as an Inclusive City; p. 63.]

**Affirmative finding.**

3. *The proposed use will not have nuisance impacts from noise, odor, dust, heat, and vibrations greater than typically generated by other permitted uses in the same zoning district;*

The proposal will continue the existing use, but in an expanded building to accommodate the range of caregivers and providers on staff. No additional impacts to the zoning district are anticipated. **Affirmative finding.**

4. *The transportation system is capable of supporting the proposed use in addition to the existing uses in the area. Evaluation factors include street designations and capacity; level of service and other performance measures; access to arterial roadways; connectivity, transit availability, parking and access; impacts on pedestrian, bicycle and transit circulation; safety for all modes; and adequate transportation demand management strategies;*

VHB's Traffic Memorandum dated August 9, 2023 reflects an analysis where volumes were scaled up to the 2028 Design Hour Volume (CHV), the 30<sup>th</sup> highest traffic hour of the year. Factors were applied for seasonality and future growth to 2028.

Volumes were also adjusted to account for the opening of the Champlain Parkway.

The net trip generation above current use is anticipated to be 52 AM peak hour trips

and 60 PM peak hour trips. Although the area is well-served by transit, pedestrian and bike facilities, no reduction was made for alternative modes in order to offer a conservative number. Delay increases are forecast to be less than 2 seconds for any given approach.

Based on the results of the VHS Traffic Impact Study, the proposal is not anticipated to generate unreasonable congestion condition on the roadway network.

The plan shows the existing bus stop on Pine Street being relocated several feet to the south. GMT has approved relocation of the bus stop as proposed. **Affirmative finding.**

*And*

5. *The utilization of renewable energy resources;*

The building is proposed to be an entirely electric air-based building system, towards Burlington's goal of Net Zero Energy. Towards that end, the applicants request the available 5% variation to height to support the systems required of this newer energy model. See **Section 5.2.6 Building Height Limits, (c) Exceptions to Height Limits, 6,** below. **Affirmative finding with DRB concurrence.**

*And*

6. *Any standards or factors set forth in existing City bylaws and city and state ordinances.*

Impact fees will be assessed for the net new area.

A letter of sewer and water capacity will be required from Burlington's Water Resources Division.

Storm and EPSC plans will be required.

A state wastewater permit will be required.

**Affirmative finding as conditioned.**

**Article 4: Zoning Maps and Districts**

**Section 4.4.2 Neighborhood Mixed Use Districts**

*(a) Purpose*

*The Neighborhood Mixed Use Districts promote development that combines non-residential and residential uses on a single site. These zones allow an increased intensity of development than would typically be found in the surrounding residential areas, and provides neighborhood-oriented good and services and employment opportunities within walking and biking distance. This development type will support transit use, provide a buffer between busy streets and residential neighborhoods, and provide new commercial and residential opportunities in the City. The emphasis of non-residential uses should primarily be oriented to serving the needs of the surrounding neighborhoods and other neighborhood commercial uses.*



*Development is intended to consist primarily of businesses on the ground floor with housing and other non-residential uses on the upper stories....Development is intended to be pedestrian oriented with buildings oriented to the sidewalk, especially at corners. Parking is intended to be hidden from the street, since its appearance is out of character with the surrounding residential development and desired orientation of the buildings.*

*2. The Neighborhood Mixed Use (NMU) district is intended to preserve and enhance historically commercial areas while reinforcing the compact scale and development patterns within the city's older neighborhoods. Uses are intended to provide neighborhood oriented goods and services and employment opportunities within walking or biking distance of residential neighborhood,*

*(b) Dimensional Standards and Density:*

*The density and intensity of development, dimensions of building lots, the heights of buildings and their setbacks from property boundary lines, and the limits on lot coverage shall be governed by the following standards:*

**Table 4.4.2 -1 Dimensional Standards and Density**

5. Notwithstanding footnote 4, the NMU district at the intersection of Pine St. and Flynn Avenue shall have a minimum front yard setback of 10 feet.

|            |                |            |                      |                      |                      |                                       |
|------------|----------------|------------|----------------------|----------------------|----------------------|---------------------------------------|
| <b>NMU</b> | <b>2.0 FAR</b> | <b>80%</b> | <b>0<sup>5</sup></b> | <b>0<sup>2</sup></b> | <b>0<sup>2</sup></b> | <b>Min: 2'. 2 stories<br/>Max: 35</b> |
|------------|----------------|------------|----------------------|----------------------|----------------------|---------------------------------------|

**Affirmative finding with allowable 5% height variation.**

| <b>Districts</b> | <b>Max. Intensity<br/>(floor area ratio<sup>1</sup>)</b> | <b>Max. Lot Coverage</b> | <b>Minimum Building Setbacks (feet)</b> |             |             | <b>Building Height<br/>(feet)</b> |
|------------------|----------------------------------------------------------|--------------------------|-----------------------------------------|-------------|-------------|-----------------------------------|
|                  |                                                          |                          | <b>Front<sup>3</sup></b>                | <b>Side</b> | <b>Rear</b> |                                   |

|                  |                             |                           |                                                                              |                                                                                                                                                                                                            |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------|-----------------------------|---------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 300 Flynn Avenue | .26 existing, .63 proposed. | 41% existing 58% Proposed | 11' Flynn (min 10' required)<br>18' Pine (min. 10' required) per Footnote 5. | 104 feet from the west property line (zero feet minimum required), 164 feet from north property line (zero feet minimum required), and 3.4 feet from southeast property line (zero feet minimum required). | N/A | 36.5'<br><br>Per Article 5.2.6(c)(6) of the CDO, the applicant requests consideration for a 5% variation (1.75' max) in the allowable building height to account for grade changes across the site. An additional 1.5 feet in building height will help the design team with managing the grades as they modulate towards Englesby Brook and will enable the building to better support the fully electric air-based building systems needed to provide the clients and staff with good indoor air quality. |
|------------------|-----------------------------|---------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

*(c) Permitted and Conditional Uses*

Office – Medical is a permitted use in the NMU zoning district; a Mental Health Crisis Center is a Conditional Use in the NMU district (Section 5.4.11, below.)

*(d) District Specific Regulations:*

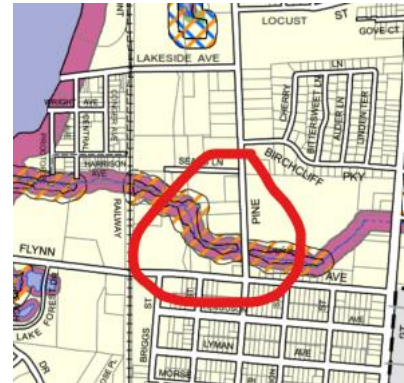
1. *Ground floor residential uses restricts*  
Not applicable in NMU.
2. *Exception to maximum lot coverage in NAC District*  
Not applicable in NMU.
3. *Development Bonuses/Additional Allowances*  
No development bonuses are requested. Not applicable.

**Section 4.5.4 Natural Resource Protection Overlay (NR) District**

300 Flynn Avenue is within the:

1. **Riparian and Littoral conservation Zone**, and
2. **Wetland Conservation Zone**.

Reference is made to Plan C2.0, Site Grading and Layout Plan for the delineation; and the report of Gilman & Briggs Environmental. **Affirmative finding.**



**(b) District Specific Regulations: Riparian and Littoral Conservation Zone**

*Permitted Uses: Except where otherwise noted herein, only the following uses are permitted within the Riparian and Littoral Conservation Zone and its associated buffer subject to the requirements and limitations set forth below under subpart 4.*

- A. *Normal maintenance of existing lawns and maintained grounds including mowing, trimming of vegetation and the removal of dead or diseased vegetation around a residence, decorative landscaping and planting, vegetable and flower gardens, and the repair of existing private landscaping structures such as walkways and walls;*
- B. *“Accepted agricultural and silvicultural practices” as defined under 24 VSA Ch 117;*
- C. *Normal maintenance of constructed wetlands and stormwater systems, provided that naturally occurring wetlands are not disturbed in conjunction with the maintenance;*
- D. *Normal maintenance of existing docks, roads, rail lines, bridges, and culverts provided that disturbance to any shoreland is minimized in conjunction with such maintenance;*
- E. *Selective cutting of less than 25 percent of the trees six inches or more in diameter at breast height over any 10 year cycle; and,*
- F. *Recreational and educational activities such as hiking, walking, fishing, nature study, and bird watching and associated boardwalks and unimproved trails.*

The mapped area falls on the north side of the parcel, outside of the development area. No change in use is proposed. Reference is made to the Gilman & Briggs analysis, which recommends *not* just during the redevelopment project, but going forward long-term, the Howard Center should prioritize tree growth where it now exists, e.g. retaining the trees now there, replanting any that may die, and adding others as appropriate.<sup>1</sup>

**Affirmative finding.**

**2. Prohibited Uses:**

---

<sup>1</sup> Gilman & Briggs Environmental, 9 March 2022, p. 2.

*Except where noted herein, the following uses shall be prohibited within the Riparian and Littoral Conservation Zone and its associated buffer.*

- A. The deposition or introduction of organic and inorganic chemicals, including herbicides and pesticides, except when the application of pesticides is reviewed and approved by the BCB and DRB, and performed by an applicator certified by the Vermont Department of Agriculture for the sole purpose of controlling invasive species and subject to the requirements of the City's pesticide application ordinance (Burlington Code of Ordinances, Chapter 17, Section 9); and,*
- B. The off-road use of any motorized vehicles including ATVs or dirt bikes (the temporary use of motorized vehicles used to construct and maintain permitted or regulated activities are specifically exempted from this prohibition);*

None of these uses are proposed. **Affirmative finding.**

### **3. Regulated Uses:**

*Except where otherwise noted herein, all uses permitted or conditionally permitted in the respective underlying zoning district, including any construction of buildings or other structures, and roads, parking areas or any other impervious surface, may be approved only within the Riparian and Littoral Conservation Zone and its associated buffer after review and approval pursuant to the requirements and limitations below under Subpart 4.*

### **4. Requirements**

- 1. Any land disturbing activities (i.e., vegetation has been removed, or the landscape has been graded or filled resulting in bare soil surfaces) shall include a stormwater management, erosion prevention and sediment control plan pursuant to the requirements of Sec 5.5.3 to be reviewed by the conservation board and approved by the city engineer.*

*In making determinations and decisions required herein, the city engineer shall consider the requirements of the most recent State of Vermont Stormwater Management Rules and Guidance document. The city engineer shall require the best practicable means be used to manage stormwater, prevent erosion, and control sedimentation. The city engineer is hereby authorized to develop performance standards to ensure conformance with these state stormwater management rules.*

A Stormwater and Erosion Prevention and Sediment Control Plan accompanies this application; its review and approval a condition of any permit. **Affirmative finding as conditioned.**



**(d) District Specific Regulations: Wetland Conservation Zone:**

**1. Additional Application Requirements**

*The following information shall be submitted in addition to the applicable requirements of Article 3 for any development involving a wetland or wetland buffer zone:*

- A. Boundary Determination: The boundaries of a wetland shall be determined in the field by a qualified professional with expertise in wetland delineation and surveyed by a licensed land surveyor or other qualified individual. The boundary between wetland and upland shall be delineated by the methodology set forth in the Vermont Wetland Rules. The identification and delineation of wetlands for a proposed project must be performed within a five-year period prior to submission and acceptance of a complete zoning application;*
- B. A report addressing the project's impact on the wetland functions and values, and the measures that the applicant has incorporated into the project to avoid and minimize wetland impacts shall be prepared by a qualified professional with expertise in wetland delineation and evaluation;*
- C. A site plan for a project that will impact a wetland or buffer zone shall include delineated wetland boundaries, buffer zone boundaries, erosion control measures, and all components of the proposed project, including, but not limited to all structures, driveways, parking areas, lawns, utilities, and the overall footprint of the construction area/zone of disturbance; and,*
- D. As part of their application, applicants must submit a complete stormwater management, erosion prevention and sediment control plan pursuant to the requirements of Sec 5.5.3, and successfully demonstrate how the project will prevent adverse impacts to surface water and groundwater quality before, during, or after construction. At a minimum, an applicant should demonstrate how a project will meet the standards outlined in the latest edition of the Vermont Soil Erosion Handbook.*

The applicant has provided a wetland delineation (See Plan C2.0, Site Grading and Layout Plan); an environmental impact analysis (see Gilman & Briggs Environmental report, dated 9 March 2022). Any application will be required to provide a Stormwater and Erosion Prevention and Sediment Control Plan, which is subject to review and approval by the Stormwater Engineer.  
**Affirmative finding as conditioned.**

**2. Permitted Uses:**

*Except where otherwise noted herein, only the following uses are permitted within a wetland and its buffer zone subject to the requirements and limitations set forth below under Subpart 6.*

- A. Normal maintenance of existing lawns and maintained grounds including mowing, trimming of vegetation and the removal of dead or diseased vegetation*

*around a residence, decorative landscaping and planting, vegetable and flower gardens, and the repair of existing private landscaping structures such as walkways and walls;*

- B. “Accepted agricultural and silvicultural practices” as defined under 24 VSA Ch 117.*
- C. Normal maintenance of constructed wetlands and stormwater systems, provided that naturally occurring wetlands are not disturbed in conjunction with the maintenance;*
- D. Normal maintenance of existing roads, rail lines, bridges, and culverts provided that disturbance to naturally occurring wetlands and shorelands is minimized in conjunction with such maintenance;*
- E. Selective cutting of less than 25 percent of the trees six inches or more in diameter at breast height over any 10 year cycle; and,*
- F. Recreational and educational activities such as fishing, walking, hiking, nature study, and bird watching.*

No change in use is proposed. See Gilman & Briggs recommendation to prioritize tree growth.

**Affirmative finding as conditioned.**

**3. Prohibited Uses:**

*Except where noted herein, the following uses shall be prohibited within a wetland and its buffer zone.*

- A. The deposition or introduction of organic and inorganic chemicals, including pesticides, except when the application of pesticides is reviewed and approved by the BCB and DRB, and performed by an applicator certified by the Vermont Department of Agriculture for the sole purpose of controlling invasive species and subject to the requirements of the City’s pesticide application ordinance (Burlington Code of Ordinances, Chapter 17, Section 9); and,*
- B. The off-road use of any motorized vehicles including ATVs or dirt bikes (the temporary use of motorized construction vehicles used to construct permitted or regulated activities in the wetland are specifically exempted from this prohibition) ;*

None of these uses are proposed. **Affirmative finding.**

**4. Regulated Uses:**

*Except where noted herein, all uses permitted or conditionally permitted in the respective underlying zoning district, including the list of activities below, may be approved within a wetland and its buffer zone after review and approval pursuant to the requirements and limitations set forth below under Subpart 6 below.*

- A. *The construction of buildings or other structures, and roads, parking areas or other impervious surface;*
- B. *Any form of drainage, dredging, excavation, or removal of material either directly or indirectly;*
- C. *Alteration or modification of natural drainage patterns, natural features and contours;*
- D. *Installation of docks, rip-rap or other shoreline stabilization features;*
- E. *Installation of utility poles or utility service lines, underground pipes or cable conduits, and wells;*
- F. *Cutting of greater than 25 percent of the trees six inches or more in diameter at breast height over any 10 year cycle;*
- G. *Construction, expansion or placement of any structure;*
- H. *Construction or expansion of roads, rail lines parking areas, trails, and sidewalks;*
- I. *Introduction of any form of pollution, including but not limited to the installation of a septic tank, the running of a sewer outfall, or the discharge of sewage treatment effluent or other liquid wastes into or so as to drain into a wetland;*
- J. *The construction of a stormwater outfall as part of a stormwater management plan approved by the city engineer. In making determinations and decisions required herein, the city engineer shall consider the requirements of the most recent State of Vermont Stormwater Management Rules and Guidance document. The city engineer shall require the best practicable means be used to manage stormwater and prevent erosion and control sediment and the city engineer is hereby authorized to develop performance standards to ensure conformance with these state stormwater management rules; and,*
- K. *Application of pesticides performed by an applicator certified by the Vermont Department of Agriculture for the sole purpose of controlling invasive species and subject to the requirements of the City's pesticide application ordinance (Burlington Code of Ordinances, Chapter 17, Section 9). In no other cases shall pesticides be applied.*

The Conservation Board reviewed the application September 11, 2023, and made a motion to recommend approval subject to the following conditions:

- *Encourage native plants throughout the site and particularly within the buffer areas.*

**Affirmative finding as conditioned.**

## **5. Prohibited activities in a vernal pool and buffer zone:**

*Except where noted herein, the following uses shall be prohibited within a vernal pool and its respective buffer.*

- A. Any activities which disturb the area within 100 feet of a vernal pool, including, but not limited to timber harvesting, disturbance of the understory vegetation, pesticide or herbicide application, the erection of fences or other barriers to amphibian dispersal, barriers and any other type of human activities that disturb the vegetation or water quality in the pool and buffer.*

Not applicable.

## **6. Criteria for Review**

*In granting, denying, or conditioning any permit involving a wetland, vernal pool or respective buffer zone, the DRB, in consultation with the conservation board, will consider the project's impact on the functions and values of the wetland, and the measures that the applicant has incorporated into the project to avoid and minimize impacts. The DRB shall only approve a project having an impact on a wetland or wetland buffer zone if an applicant can demonstrate that any adverse impact is de minimus on the significant functions and values of the wetland including:*

- A. Water storage for floodwater and stormwater;*
- B. Erosion and sedimentation control through binding and stabilizing the soil or shoreline;*
- C. Surface water and groundwater protection, including sediment and toxicant retention, nutrient retention and transformation, and groundwater discharge and recharge;*
- D. Fisheries habitat;*
- E. Wildlife habitat;*
- F. Examples of natural community types that are exemplary, rare, or make an important contribution to the natural heritage of Burlington and Vermont;*
- G. Habitat for rare, threatened and endangered species;*
- H. Education and research in natural sciences;*
- I. Recreational and economic benefits; and,*
- J. Open space and aesthetics.*

*In addition, the review of a project having involving a wetland or wetland buffer zone shall also be subject to the following requirements and limitations:*

- K. Any land disturbing activities (i.e., vegetation has been removed, or the landscape has been graded or filled resulting in bare soil surfaces) shall include a stormwater management, erosion prevention and sediment control plan pursuant to the requirements of Sec 5.5.3 to be reviewed by the conservation board and*



*approved by the city engineer;*

- L. No new stormwater outfall shall directly discharge into surface water without approval and implementation of a stormwater management plan approved by the city engineer;*
- M. No installation of docks, rip-rap or other shoreline stabilization features shall be installed without review approval by the city engineer;*
- N. Agricultural and silvicultural activities shall follow Best Management Practices for the Protection of Water Quality; and,*
- O. Stormwater management, erosion, and sedimentation control plans shall be submitted for review by the conservation board who shall consult with the development review board and city engineer prior to issuance of a recommendation to the city engineer who shall render a final decision on such plans.*

*In making determinations and decisions required herein, the city engineer shall consider the requirements of the most recent State of Vermont Stormwater Management Rules and Guidance document. The city engineer shall require the best practicable means be used to manage stormwater and control erosion and sedimentation and the city engineer is hereby authorized to develop performance standards to ensure conformance with these state stormwater management rules.*

As shown on the attached site grading and layout plan, Englesby Brook and an associated Class II wetland encompasses the northern portion of the site. The limits of the wetland were delineated by Gilman & Briggs Environmental and are depicted on the plan. The plan also shows the limits of the state's regulated 50-foot wetland buffer and the City's 100 foot wetland and riparian and littoral conservation zones.

The project reduces the area of impact to the 50' wetland buffer zone, 100' wetland buffer zone,

| OVERLAY DISTRICTS                       |                                          |           |           |
|-----------------------------------------|------------------------------------------|-----------|-----------|
| DISTRICT                                |                                          | EXISTING  | PROPOSED  |
| WETLAND CONSERVATION ZONE               | DISTURBANCE IN 50' BUFFER                | 5,140 SF  | 4,110 SF  |
|                                         | DISTURBANCE BETWEEN 50' & 100' BUFFER    | 16,290 SF | 16,180 SF |
| RIPARIAN AND LITTORAL CONSERVATION ZONE | DISTURBANCE 100' UPLAND OF ENGLSBY BROOK | 11,560 SF | 10,581 SF |
| STEEP SLOPES DISTRICT                   | AREAS STEEPER THAN 15%                   | 18,250 SF | 18,250 SF |

and 100' riparian buffer zone compared to the existing site. (Zoning Table, Sheet C0.0) The tree line will not be significantly altered, and best management practices will be used to prevent erosion and control sedimentation during construction. In addition, the

stormwater management system will effectively treat runoff before it enters the wetland/riparian buffer zones and control the release of runoff to protect the existing stream channel.

A submitted wetland and natural resources evaluation memorandum prepared by Gilman &

Briggs, who conclude that the project is well designed with better water quality infrastructure than currently exists and there will be no negative impact to the wetland, wetland buffer or natural resource areas.

As noted, the Conservation Board supports approval.

**Affirmative finding as conditioned.**

## **Article 5: Citywide General Regulations**

### **Section 5.2.1 Existing Small Lots.**

Not applicable.

### **Section 5.2.2 Required Frontage or Access**

There is established access from both Pine Street and Flynn Avenue. **Affirmative finding.**

### **Section 5.2.3 Lot Coverage Requirements**

See Table 4.4.2-1, above.

### **Section 5.2.4 Buildable Area Calculation & Steep Slopes Overlay District**

#### *(a) Buildable Area Calculation*

Buildable area standards are not applicable in NMU.

#### *(b) Steep Slopes Overlay District*

300 Flynn Avenue falls within the Steep Slopes Overlay District, delineated in **Map 5.2.4-1 – Steep Slopes Overlay District**. The applicant has defined the boundary on *Existing Conditions Plan C1.0*.



#### *1. District Specific Regulations*

- A. *The Steep Slope Overlay District shall be an overlay on all zoning districts. The regulations in the overlay are in addition to those regulations of the underlying zoning district.*
- B. *These regulations apply to applications within the Overlay District that include 400 square feet or more of earth disturbance.*
- C. *Finished slopes of all cuts and fills shall not exceed 30%, unless the applicant can demonstrate that steeper slopes can be stabilized and maintained adequately to the satisfaction of the ZAO or DRB in consultation with the City Engineer.*
- D. *Any fills placed on a steep slope shall be property stabilized and, when necessary, supported by retaining walls or other appropriate measures as approved by the ZAO or DRB in consultation with the City Engineer.*
- E. *Finished grades shall be reasonably safe from slide, collapse, or similar failure as determined by the ZAO or DRB in consultation with the City Engineer.*

#### *2. Additional Application Requirements*

- A. A site plan prepared by a registered professional engineer or surveyor that accurately depicts the proposed development and related land disturbance relative to the Steep Slope Overlay District boundaries, with all pertinent information describing the proposal, and a topographical survey depicting existing and proposed contour lines at no greater than 2-foot intervals. The plan shall depict all proposed cut, fill, and grading.
  - B. A plan depicting the extent of proposed vegetation clearing.
3. Approval Condition
- A. Prior to construction, the applicant shall provide a geotechnical analysis prepared and stamped by a professional geotechnical engineer that determines the suitability of the steep slope for development.

The steep slopes are labelled and hatched on Existing Conditions Plan C1.0... see excerpt



below. The hatch also shows up on sheets C2.0 and C2.1. The redevelopment has been designed to avoid the identified area.

**Affirmative finding.**

#### **Section 5.2.5 Setbacks**

See Table 4.4.2-1, above.

#### **Section 5.2.6 Building Height Limits**

The application proposes a building height of 36'5", above the 35' maximum. The applicant requests consideration of the 5% variation under:

##### **(c) Exceptions to Height Limits:**

- 6. The administrative officer may allow for up to a 5% variation in the maximum building height to account for grade changes across the site. In no event however, shall such additional height enable the creation of an additional story beyond the maximum permitted.

From the applicant: "An additional 1.5 feet will help the design team with managing the grades as they modulate towards Englesby Brook and will enable the building to better support the fully electric air-based building systems needed to provide the clients and staff with good indoor air quality." **Affirmative finding** with up to 5% variation allowance.

#### **Section 5.2.7 Density and Intensity of Development Calculations**

##### **(c) Floor Area Ratio**

The zoning district maximizes FAR at 2.0; the limitations of the development area have concentrated the development into the three story building presented in the application. The application presents an FAR of .26 existing and .63 proposed.

**Affirmative finding.**

## **Part 4: Special Use Regulations**

### **Section 5.4.11 Mental Health Crisis Center**

*A Mental Health Crisis Center shall be considered a conditional use in the Neighborhood Mixed-Use (NMU) district and subject to all applicable provisions of Article 3, Part 5 and the site and design review standards in Article 6. In addition to conditional use standards, proposals for a Mental Health Crisis Center shall also comply with the following requirements:*

- (a) A Mental Health Crisis Center may only be permitted on lots fronting on Flynn Avenue and/or Pine Street within one thousand feet of the northwest corner of Pine St. and Flynn Avenue.*
- (b) Inpatient short-term crisis care shall not exceed fourteen (14) consecutive nights;*
- (c) The number of beds for inpatient use shall not exceed ten (10);*
- (d) All dimensional standards for the underlying zoning per the requirements of Article 4 shall be applicable.*

The redevelopment site fronts both Flynn Avenue and Pine Street. This is a pre-existing use. No inpatient services are currently offered. The remainder of the standards shall be a condition of any permit.

**Affirmative finding as conditioned.**

### **Section 5.4.8 Historic Buildings and Sites**

From David Blow's *Historic Guide to Burlington Neighborhoods* (Vol I):

*Directly across from the church on Flynn Avenue stands the former convent of the Sisters who staff St. Anthony's school. Designed by Julian Goodrich, it was constructed in 1961. When the school closed, the Sisters left the parish and the building served for a short time as an inter-parish center for religious education and was also utilized by the Vermont Ecumenical Council. Finally in 1975 the parish sold the building to Howard Mental Health Service, the current owners.<sup>2</sup>*

The former convent is not listed on the state or National Register. Historic Building Standards are not applicable.

## **Part 5: Performance Standards**

### **Section 5.5.1 Nuisance Regulations**

The redevelopment project will continue the existing use. The Traffic Analysis memo concludes that the project is not anticipated to generate unreasonable congestion conditions on the adjacent roadway network. No additional adverse impacts are forecast. **Affirmative finding.**

### **Section 5.5.2 Outdoor Lighting**

The narrative defines:

*Safety and security for staff and clients is of utmost importance to Howard Center. To those ends, parking lot and parking garage lighting will be as bright as possible (while meeting*

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<sup>2</sup> Blow, David J., *Historic Guide to Burlington Neighborhoods Vol. I* (Burlington, Chittenden County Historical Society, 1991). 81-82.



*Burlington's lighting limits) to create a safe environment.*

The lighting plan in on sheet L4.00. While light levels are acceptable, the Max/Min ratio defined in the plans for Parking Lot Lighting exceeds the ordinance maximum of 20:1. (Section 5.5.2 f. 1.D) As proposed, there is an extreme between the high and low light levels, which leads to feelings of insecurity when walking through the parking lot. This ratio must be adjusted.

**Affirmative finding as conditioned.**

### **Section 5.5.3 Stormwater and Erosion Control**

The submission narrative states:

“The proposed stormwater management plan will significantly improve the detention and treatment of stormwater on the site compared to existing conditions. The stormwater management plan involves the installation of practices to both treat and detain runoff from the site to reduce pollutant load and peak flows to Englesby Brook and the surrounding wetland. Stormwater from the building roof and parking areas will be directed to high-flow vegetated filters which will provide water quality treatment. The water will then flow into a system of buried chambers which have a controlled outlet. This system allows for the slow release of stormwater back towards the wetland without increasing peak flows. This proposed system surpasses the plan outlined in the Englesby Brook Flow Restoration Plan.”

Both the Stormwater and EPSC are subject to review and approval of the Stormwater Engineer.

**Affirmative finding as conditioned.**

### **Section 5.5.4 Tree removal**

Plan L1.00 defines the removal of 2 existing trees at 857 Pine Street, an abutting property. Only alterations to the 300 Flynn Avenue parcel are under consideration with this Sketch Plan review. The Gilman & Briggs Environmental Plan makes note of no tree removal on the subject parcel.

**Affirmative finding.**

## **Article 6: Development Review Standards**

### **Part 1: Land Division Design Standards**

No land division is proposed. Not applicable.

### **Part 2: Site Plan Design Standards**

#### **Sec. 6.2.2 Review Standards**

#### **(a)Protection of Important Natural Features:**

The Wetland immediately north of the development site is the most important natural feature. See Gilman & Briggs Environmental Memorandum dated 9 March 2022 relative to existing species, alluvial area, and recommendations. The assessment includes:

The relatively good condition of the wetland in the ravine is maintained, in my estimation by the shade from the tree canopy, which suppresses growth of invasive shrubs, this feature of the project is important. I recommend that, not just during the redevelopment project, but

going forward long-term, the Howard Center should prioritize tree growth where it now exists, e.g., retaining the trees now there, replanting any that might die, and adding others as appropriate.

I suggest also controlling the spread of Japanese knotweed from its existing location.

**Affirmative finding as conditioned.**

**b) Topographical Alterations:**

The plan takes great care to avoid the sensitivity of the natural area on the north of the site. Minimal grade changes (~200 SF) are proposed near the Pine Street parking lot to convey more area to stormwater treatment and away from the municipal system. All disturbed areas will be backfilled or fine graded, seeded, and covered with erosion control matting. **Affirmative finding.**

**(d) Protection of Important Public Views:**

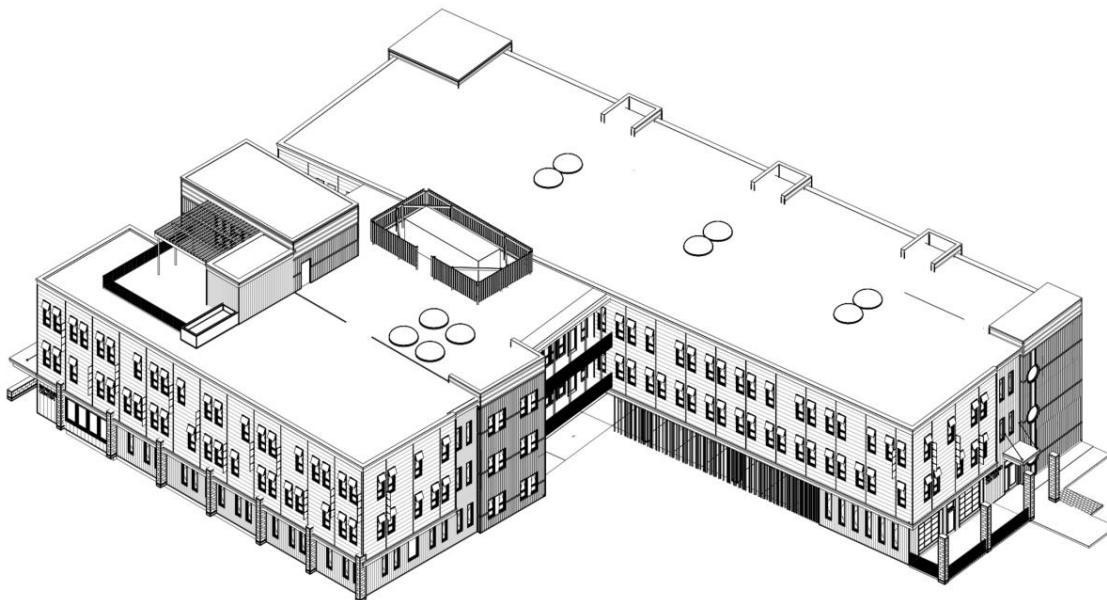
There are no protected important public views from or through this site. Not applicable.

**(d) Protection of Important Cultural Resources:**

Not applicable.

**(e) Supporting the Use of Renewable Energy Resources:**

The project will be advanced without the use of any fossil fuels. To achieve this, the building will be insulated above code minimums with a goal of meeting the Passive House air sealing requirements. Heating and cooling will be accomplished using geothermal heat pumps. Ventilation is provided using high efficiency balanced ventilation with heat recovery. The central



1 SOUTHEAST AXON  
Scale: 1/16" = 1'-0"

ventilator will be located on the roof and screened from public view. Domestic hot water will utilize air source heat pump technology. The roof has been designed for future rooftop solar. The design team is working with Burlington Electric Department to maximize opportunities for energy efficiency.

The specific design choices to accommodate the heating/cooling systems require greater building height. Per Article 5.2.6(c)(6) of the CDO, the applicant requests consideration for a 5% variation in the allowable building height to account for grade changes across the site. An additional 1.5 feet in building height will help the design team with managing the grades as they modulate towards Englesby Brook and will enable the building to better support the fully electric air-based building systems needed to provide the clients and staff with good indoor air quality.

**Affirmative finding.**

**(e) Brownfield Sites:**

This site is not identified on the State of Vermont Brownfield list. Not applicable.

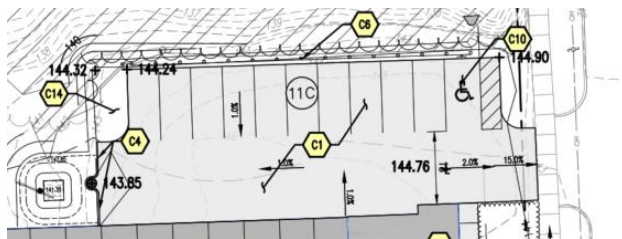
**(g) Provide for nature's events:**

*Special attention shall be accorded to stormwater runoff so that neighboring properties and/or the public stormwater drainage system are not adversely affected. All development and site disturbance shall follow applicable city and state erosion and stormwater management guidelines in accordance with the requirements of Art 5, Sec 5.5.3.*

Both a Stormwater and Erosion Prevention and Sediment Control Plan have been submitted for Water Resource / Stormwater Engineering review.

*Design features which address the effects of rain, snow, and ice at building entrances, and to provisions for snow and ice removal or storage from circulation areas shall also be incorporated.*

There are protected entries on both Flynn Avenue and Pine Street. Snow storage is located on the site plan. (Plan C2.0. Snow storage is identified as C14.) **Affirmative finding.**



**(h) Building Location and Orientation:**

The site is rather unique, as it fronts on both Pine Street and Flynn Avenue; wrapping around an existing structure on the immediate corner. Both elevations are designed with a welcoming street façade. **Affirmative finding.**

**(i) Vehicular Access:**

Vehicular access is available at both street frontages, with a designed circulation path illustrated on plan C2.0. **Affirmative finding.**

**(j) Pedestrian Access:**

Pedestrian entry is available at both the Pine Street and Flynn Avenue frontages; connected directly to the public sidewalk. The proposed Boardwalk on Flynn Avenue extends into the public right-of-way. Consultation with a DPW encroachment officer indicates acceptance of the walkway connections to sidewalk. [Email from C. Manna, 9.18.2023.] The extended curb will define the on-street parking area.

**Affirmative finding.**



**(k) Accessibility for the Handicapped:**

The building has been designed to be fully accessible, with available elevators and identified ADA access parking spaces. Burlington's Building Official has the jurisdiction to confirm ADA compliance. **Affirmative finding.**

**(l) Parking and Circulation:**

*To the extent possible, parking should be placed at the side or rear of the lot and screened from view from surrounding properties and adjacent public rights of ways.*

The westerly and northerly lots are existing, although expansion and improvements are proposed.

*Surface parking and maneuvering areas should be shaded in an effort to reduce their effect on the local microclimate, air quality, and stormwater runoff with an objective of shading at least 30% of the parking lot. Shading should be distributed throughout the parking area to the greatest extent practical, including within the interior depending on the configuration. New or substantially improved parking areas with 15 or more parking spaces shall include a minimum of 1 shade tree per 5 parking spaces with a minimum caliper size of 2.5-3" at planting. Up to a 30% waiver of the tree planting requirement may be granted by the development review board if it is found that the standard requirement would prove impractical given physical site constraints and required compliance with minimum parking requirements. All new shade trees shall be of a species appropriate for such planting environments, expected to provide a mature canopy of no less than 25' in diameter, and selected from an approved list maintained by the city arborist. Existing trees retained within 25' of the perimeter of the parking area (including public street*



trees), and with a minimum caliper size greater than 3" may be counted towards the new tree planting requirement.

The attached landscape planting plan (sheets L2.00 and L2.01 in LA plan set) proposes a mix of trees, shrubs, ornamental grasses and perennials. Eight (8) new shade trees are proposed within and around the Flynn Avenue parking lot. The plan also proposes to save the existing, large, mature tree along the west property line. The 8 new trees plus the existing mature tree complies with the shading requirements for parking lots.

*All parking areas shall provide a physical separation between moving and parked vehicles and pedestrians in a manner that minimizes conflicts and gives pedestrians a safe and unobstructed route to building entrances or a public sidewalk.*

There is an identified pedestrian walkway between the westerly parking area and a building entrance.

Parking will be available at the existing westerly lot, under the building on the north side, and north of the building in an open parking area as well. The project proposes 106 total on-site parking spaces including 5 ADA accessible spaces, 2 EV charging spaces, and 8 tandem spaces.

**Affirmative finding.**

**(m) Landscaping and Fences:**

The attached landscape planting plan (sheets L2.00 and L2.01 in LA plan set) proposes a mix of trees, shrubs, ornamental grasses and perennials. Eight (8) new shade trees are proposed within and around the Flynn Avenue parking lot. The north/west of the site includes a concrete pad with fencing and a gate to enclose 2 dumpsters and recycling bins. (Plan C 2.0, item C7).

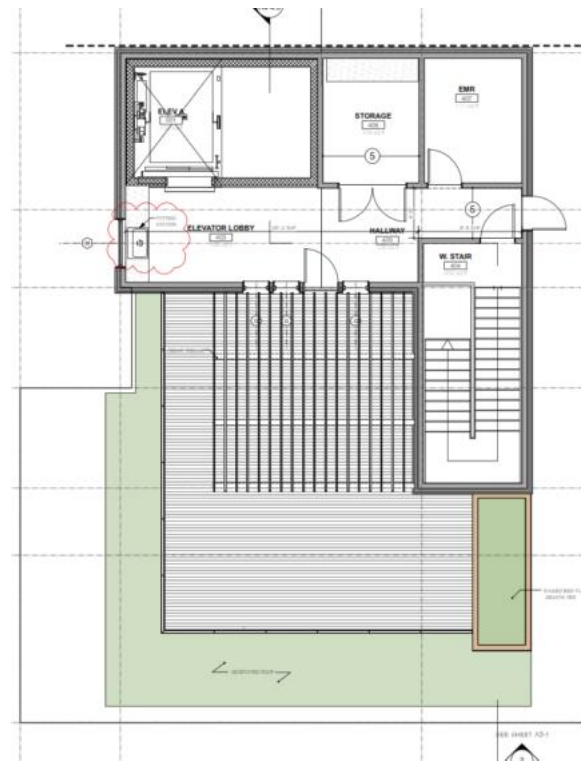
**Affirmative finding.**

**(n) Public Plazas and Open Space:**

This is not a requirement for the proposed use. The rooftop, however, features a terraced area. Per Section 5.2.6 (c) 3, *greenhouses, garden sheds, gazebos, rooftop gardens, terraces and similar features, and fully enclosed stair towers, elevator towers and mechanicals rooms, where such features are not used for human occupancy or commercial identification, are exempt from specific height limitations. Such features and structures shall be designed and clad in a manner consistent and complementary with the overall architecture of the building.*

All features illustrated on the rooftop/terrace plan are allowed by this standard; the caveat is that no part of these features can be used for occupancy.

**Affirmative finding as conditioned.**



**(o)Outdoor Lighting:**

*Where exterior lighting is proposed the applicant shall meet the lighting performance standards as per Sec 5.5.2.*

A lighting plan has been provided. Illumination levels are acceptable, but the max/min ratio for uniformity for a parking lot A (west) exceeds the 20:1 ratio defined by the ordinance. An adjustment or correction is necessary. **Affirmative finding as conditioned.**

**(p) Integrate infrastructure into the design:**

*Exterior storage areas, machinery and equipment installations, service and loading areas, utility meters and structures, mailboxes, and similar accessory structures shall utilize setbacks, plantings, enclosures and other mitigation or screening methods to minimize their auditory and visual impact on the public street and neighboring properties to the extent practicable.*

*Utility and service enclosures and screening shall be coordinated with the design of the principal building, and should be grouped in a service court away from public view. On-site utilities shall be place underground whenever practicable. Trash and recycling bins and dumpsters shall be located, within preferably, or behind buildings, enclosed on all four (4) sides to prevent blowing trash, and screened from public view.*

*Any development involving the installation of machinery or equipment which emits heat, vapor, fumes, vibration, or noise shall minimize, insofar as practicable, any adverse impact on neighboring properties and the environment pursuant to the requirements of Article 5, Part 4 Performance Standards.*

The dumpster/recycling totter location is at the north of the westerly parking area; fenced and gated to prevent blowing trash. Underground electric will run from the transformer on the south/west corner of the site. “W1” and “W2” reflect two types of water service connections from Flynn Avenue, per the direction of DPW (C2.1 Site Utility Plan.) A ventilator is placed atop the roof, which is proposed for screening. **Affirmative finding.**

**Part 3: Architectural Design Standards**

**Sec. 6.3.2 Review Standards**

**(a)Relate development to its environment:**

**1. Massing, Height and Scale:**

There is similarity in massing to Flynn Avenue Coop to the west (3 stories), 316 Flynn Avenue to the east (4 stories), and St. Anthony’s Church to the South. In massing, height and scale, 300 Flynn finds commonality with neighboring structures. **Affirmative finding.**

**2. Roofs and Rooflines.**

The low pitch membrane roof relates to 316 Flynn Avenue, Champlain Elementary School, City Market, and other former industrial buildings on Flynn Avenue. **Affirmative finding.**

### 3. Building Openings

Windows are largely vertically arranged in rhythmic patterns horizontally.

Visual interest is added in the alteration of sizes, as seen on the east and west elevations. Windows are primarily vertical in nature, with some deviation to create visual interest.



**Affirmative finding.**

#### ***(b) Protection of Important Architectural Resources:***

Not applicable.

#### ***(c) Protection of Important Public Views:***

Not applicable.

#### ***(d) Provide an active and inviting street edge:***

From the application narrative:

*Each building elevation employs diverse materials to create depth on the elevation and create an inviting street edge. Plantings along each street edge provide privacy to users as well as performing stormwater function to pre-treat roof water. **Affirmative finding.***

#### ***(e) Quality of materials:***

*All development shall maximize the use of highly durable building materials that extend the life cycle of the building, and reduce maintenance, waste, and environmental impacts. Such materials are particularly important in certain highly trafficked locations such as along major streets, sidewalks, loading areas, and driveways. Efforts to incorporate the use of recycled*

*content materials and building materials and products that are extracted and/or manufactured within the region are highly encouraged.*

The proposed materials (high density fiber cement, glazed brick, vertical and horizontal metal siding) have a 50+ year expected useful life, and do not require periodic repainting. All are considered acceptable materials for new construction. **Affirmative finding.**

**(f) Reduce energy utilization:**

From the application narrative:

*This project will not use any fossil fuels on site. To achieve this, the building will be insulated above code minimums with a goal of meeting the Passive House air sealing requirements.*

*Heating and cooling will be accomplished using geothermal heat pumps.*

*Ventilation is provided using high efficiency balanced ventilation with heat recovery. The central ventilator will be located on the roof and screened from public view. Domestic hot water will utilize air source heat pump technology. The roof has been designed for future rooftop solar. The design team is working with Burlington Electric Department to maximize opportunities for energy efficiency.*

A vegetated roof has been included; see Plan A1-4.

All new construction shall meet the Guidelines for Energy Efficient Construction according to the requirements of Article VI. Energy Conservation, Section 8 of the City of Burlington Code of Ordinances. **Affirmative finding as conditioned.**

**(g) Make advertising features complementary to the site:**

Any change to signage will require zoning review and potentially a separate permit.

**Affirmative finding as conditioned.**

**(h) Integrate infrastructure into the building design:**

See Section 6.2.2. (p), above.

**(i) Make spaces secure and safe:**

From the submission:

*Safety and security for staff and clients is of utmost importance to Howard Center. To those ends, parking lot and parking garage lighting will be as bright as possible (while meeting Burlington's lighting limits) to create a safe environment. Emergency vehicle access, including fire truck radii analysis, has been incorporated into the design. The design team has reviewed the design with the Burlington Fire Marshal.*

The parking circulation area has been designed to facilitate turning radii of emergency vehicles. Lighting shall be appropriately designed to assure visibility for persons using and observing the space. Building entrances/entry points shall be visible and adequately lit.

Redevelopment shall adhere to all applicable building and life safety code as defined by the building official and fire marshal. **Affirmative finding as conditioned.**



## **Article 8: Parking**

### **Section 8.1.3 Parking Districts**

*(c) Multimodal Mixed-Use Parking District*

*This Parking District includes all properties in the following Zoning Districts:*

*(e) Neighborhood Mixed Use (NMU)*

*...this Parking District also includes all properties with street frontage on the following major thoroughfares to a maximum depth of 200':*

*(i) Pine Street*

With the adoption of Zoning Amendment 22-07, there are no minimum parking requirements.

The property is located within the Multi-Modal Mixed Use Parking District.

### **Section 8.1.9 Maximum On-Site Parking Spaces**

Table 8.1.9-1 of the CDO does not list a maximum off-site parking requirement for mental health crisis centers. The land use category most similar to mental health crisis center for parking purposes is “crisis counseling center”, which allows maximum parking of 3 spaces per 1,000 gfa. The programmed use of the building will be a blend of scheduled outpatient services and unscheduled, drop in, as needed services. The latter relates primarily to crisis services and intake services which will be located at this site with a visitor flow that more closely aligns with the “crisis counseling center” use.

The maximum allowable number of on-site parking spaces is **150** (50,100 sf / 1,000 sf x 3). The project proposes 106 total on-site parking spaces including 5 ADA accessible spaces (exempt from the max per 8.1.9 (a)), 2 EV charging spaces, (also exempt from the max) and 8 tandem spaces. The total number of proposed parking spaces that count toward the maximum allowed is 99. **Affirmative finding.**

### **Section 8.1.14 Stacked and Tandem Parking Restrictions**

*Except as otherwise provided below, all parking facilities in all Parking Districts shall be designed so that each motor vehicle may proceed to and from the parking space provided for it without the moving of any other motor vehicle. The requirements for minimum or maximum spaces continue to apply for stacked and Tandem parking.*

*(b) Tandem Parking shall be allowed for all dwelling units (whether attached or detached).*

*Each dwelling unit may have a pair of tandem parking spaces, however any pair of tandem parking spaces shall not serve more than one dwelling unit. **Tandem parking shall also be allowed for dedicated employee-only parking where signed as such.***

**Affirmative finding as conditioned.**

### **Section 8.1.16 Transportation Demand Management**

**(b)Applicability:** *A transportation demand management program shall be required for all projects in any parking District involving any one or more of the following:*

#### **Table 8.1.16-1 Applicable Projects:**

- A non-residential or Mixed Use development with a building footprint of 8,000 sq. ft. or more; or the creation of 15,000 sq. ft. or more of gross floor area.  
Applicable TDM Sections: All provisions of Section 8.1.16 (c).

The applicant has provided a TDM plan as part of the submission.

**Affirmative finding as conditioned.**

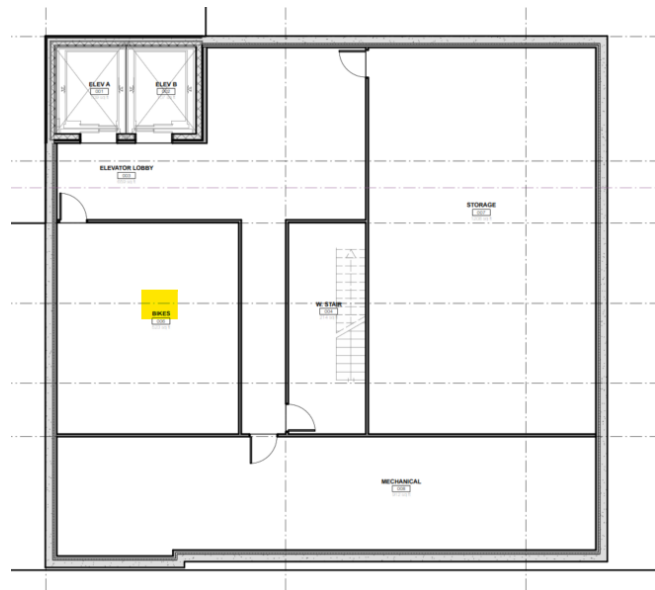
## Part 2: Bicycle Parking

**Section 8.2.4** of the CDO requires 6 short term (50,100 sf / 8,000 sf = 6) and 10 long term (50,100 / 5,000 sf = 10) bike parking spaces for this project. For short-term bike parking, 3 U-racks (6 bike parking spaces) are proposed near the main entrance on Flynn Avenue and 2 U-racks (4 bike parking spaces) are proposed near the entrance on Pine Street for a total of 10 short-term parking spaces. A minimum of 10 long term bike parking spaces will be accommodated in the basement (see basement floor plan Sheet A1-0 in architectural plan set).

**Affirmative finding.**

## II. Conditions of Approval

1. Based on the estimated net new area, the following Impact Fees are assessed:



Impact Fee calculation

300 Flynn Avenue ZP-23-398

SF of Project **26,058**

FY 24: July 1, 2023 - June 30, 2024

| Department | <u>Offices &amp; Other</u> |              |
|------------|----------------------------|--------------|
|            | Rate                       | Fee          |
| Traffic    | 0.795                      | 20,713.53    |
| Fire       | 0.234                      | 6,098.54     |
| Police     | 0.412                      | 10,746.32    |
| Parks      | 0.493                      | 12,841.85    |
| Library    | 0.000                      | 0.00         |
| Schools    | 0.000                      | 0.00         |
| Total      | 1.934                      | \$ 50,400.24 |

The applicant team shall confirm with staff the final net new area to confirm accuracy prior to payment.

2. Impact Fees shall be paid per the following schedule:  
*Section 3.3.8 (a) New buildings: Impact fees must be paid at least seven days prior to occupancy of a new building or any portion thereof.*
3. Inpatient short-term crisis care shall not exceed fourteen (14) consecutive nights;  
The number of beds for inpatient use shall not exceed ten (10).
4. Parking lot lighting for lot A must be adjusted to comply with the Max/Min ratio of 20:1.  
A revised photometric shall be provided to demonstrate the revision.
5. The Stormwater and Erosion Prevention and Sediment Control Plan are subject to review and approval by the Stormwater Engineer.
6. A state wastewater permit will be required.
7. No part of the rooftop features can be used for occupancy, to comply with the specific exemption from height limits.
8. A DPW curb cut permit will be required for the new Flynn Street entrance.
3. **With DRB concurrence**, time limits for the zoning permit will be as follows:
  - a. The zoning permit shall become invalid unless work on the project commences on or before April 1, 2026; and
  - b. All work on the project shall be completed, and a Final Zoning Certificate of Occupancy received, on or before October 1, 2027.
9. All new construction shall meet the Guidelines for Energy Efficient Construction according to the requirements of Article VI. Energy Conservation, Section 8 of the City of Burlington Code of Ordinances.
10. Any signage alterations or new signs will require zoning review and potentially a separate sign permit.
11. Tandem parking shall also be allowed for dedicated employee-only parking where signed as such.
12. Approval of this plan includes the applicants' request for available 5% variation to height to support the systems required of this newer energy model. See **Section 5.2.6 Building Height Limits, (c) Exceptions to Height Limits, 6.**
13. The TDM submitted to comply with Section 8.1.16 (c) (Transportation Demand Management) is hereby adopted, and subject to the following:

Outreach and Education – Howard Center will serve as the designated Transportation Coordinator for the TDM. The specific department and/or employee(s) to serve as the Transportation Coordinator will be identified before occupancy of the new building. The Transportation Coordinator will:

- Make TDM information available to all employees;
- Prepare/disseminate an annual travel survey of all employees; and
- Maintain record-keeping and reporting to the City of TDM activities and participation.

TDM Strategies – This TDM plan will include implementation of at least two (2) of the strategies listed below. The two (2) strategies to be implemented will be identified prior to occupancy of the building.

- 1) Maintain ongoing and active membership in CATMA.
- 2) Provide GMT passes to employees at a minimum discount of 50%.
- 3) Provide free Howard Center owned and operated car share program to employees.
- 4) Provide free bike share membership to employees.
- 5) Provide employees with a shuttle service, guaranteed ride home program, or ride to a nearby transit center.

Parking Management – Howard Center will perform annual parking utilization studies for a period of 7 years from receipt of a Certificate of Occupancy.

TDM Agreement – Prior to occupancy of the new building, Howard Center will provide a signed commitment to and acknowledgement of:

- 1) Ongoing implementation of the TDM program outlined above;
- 2) The project has no claim to the ongoing availability of nearby on-street parking;
- 3) Acknowledge that failure to maintain TDM for the required time period(s) is a violation of City ordinance; and
- 4) To notify any subsequent owners and tenants in writing of their obligations under the TDM section of City ordinance as part of any purchase and sale and/or lease agreements.

14. The applicant should prioritize tree growth where it now exists, e.g. retaining the trees now there, replanting any that may die, and adding others as appropriate.
15. The Conservation Board Encourages native plants throughout the site and particularly within the buffer areas.
16. Standard Permit Conditions 1-15 as amended by the requested Zoning Permit Time Limits.

**NOTE: These are staff comments only. The Development Review Board, who may approve, table, modify, or deny projects, makes decisions.**





## MEMORANDUM

To: Burlington Development Review Board  
Mary O'Neil, Principal Planner  
Scott Gustin, Principal Planner & Asst. Administrative Officer

From: Joe Weith, Senior Project Manager

Date: October 6, 2023

Re: Howard Center 300 Flynn Redevelopment Project – Zoning Permit Time Limit

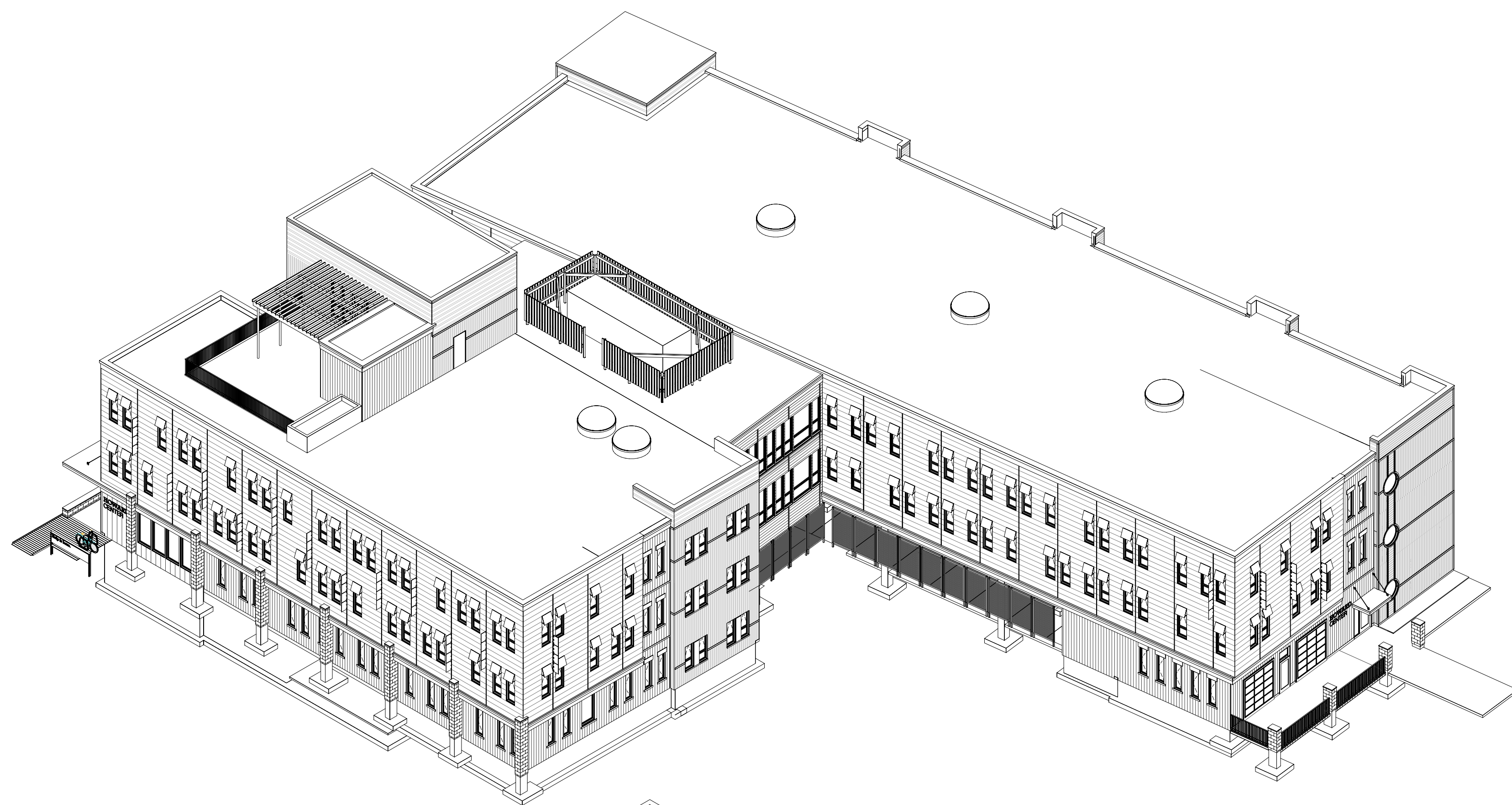
In accordance with Section 3.2.9(f) of the Burlington Comprehensive Development Ordinance, Howard Center hereby requests that the Development Review Board (DRB) approve longer time limits for the zoning permit to be issued for the above referenced project. Specifically, Howard Center requests that the DRB impose the following conditions of approval:

1. The zoning permit shall become invalid unless work on the project commences on or before April 1, 2026.
2. All work on the project shall be completed, and a Final Zoning Certificate of Occupancy received, on or before October 1, 2027.

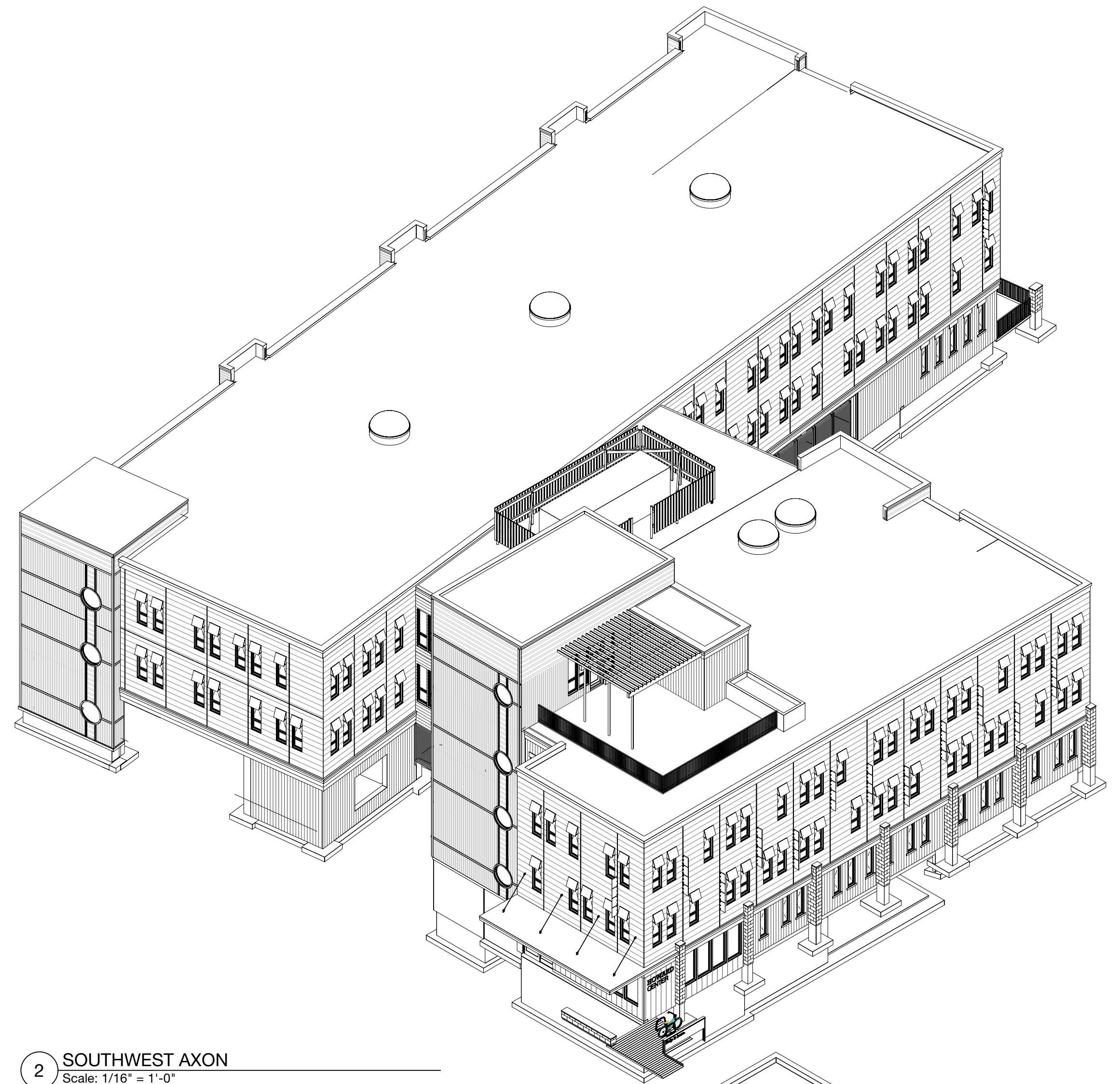
The primary reason for this request is related to Howard Center's planned capital campaign for the project. A significant portion of the total project funding will be from money raised through a capital campaign, which we anticipate could take at least a year or more before enough money is raised to allow construction to start. Having a zoning permit in hand is critical to a successful capital campaign for a development project, which is why we are seeking DRB approval and a zoning permit before Howard Center starts the capital campaign.

Due to various reasons (including the recent announcement by long time CEO Bob Bick to retire next year), Howard Center needs to delay the start of the capital campaign until late summer/fall, 2024. Therefore, considering the delayed start and length of time for a capital campaign, Howard Center likely will not be ready to start construction of the project until Spring 2026.

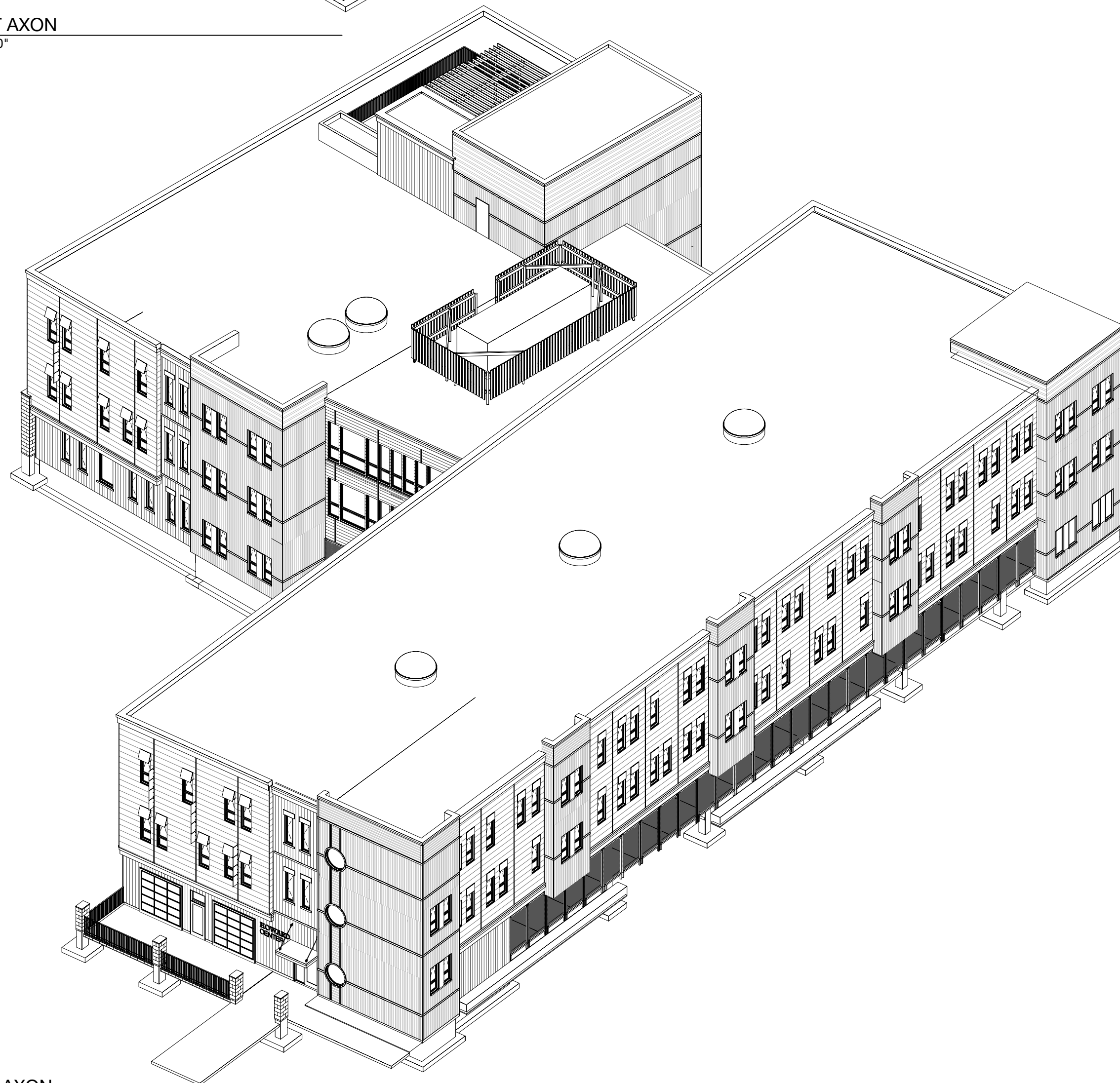




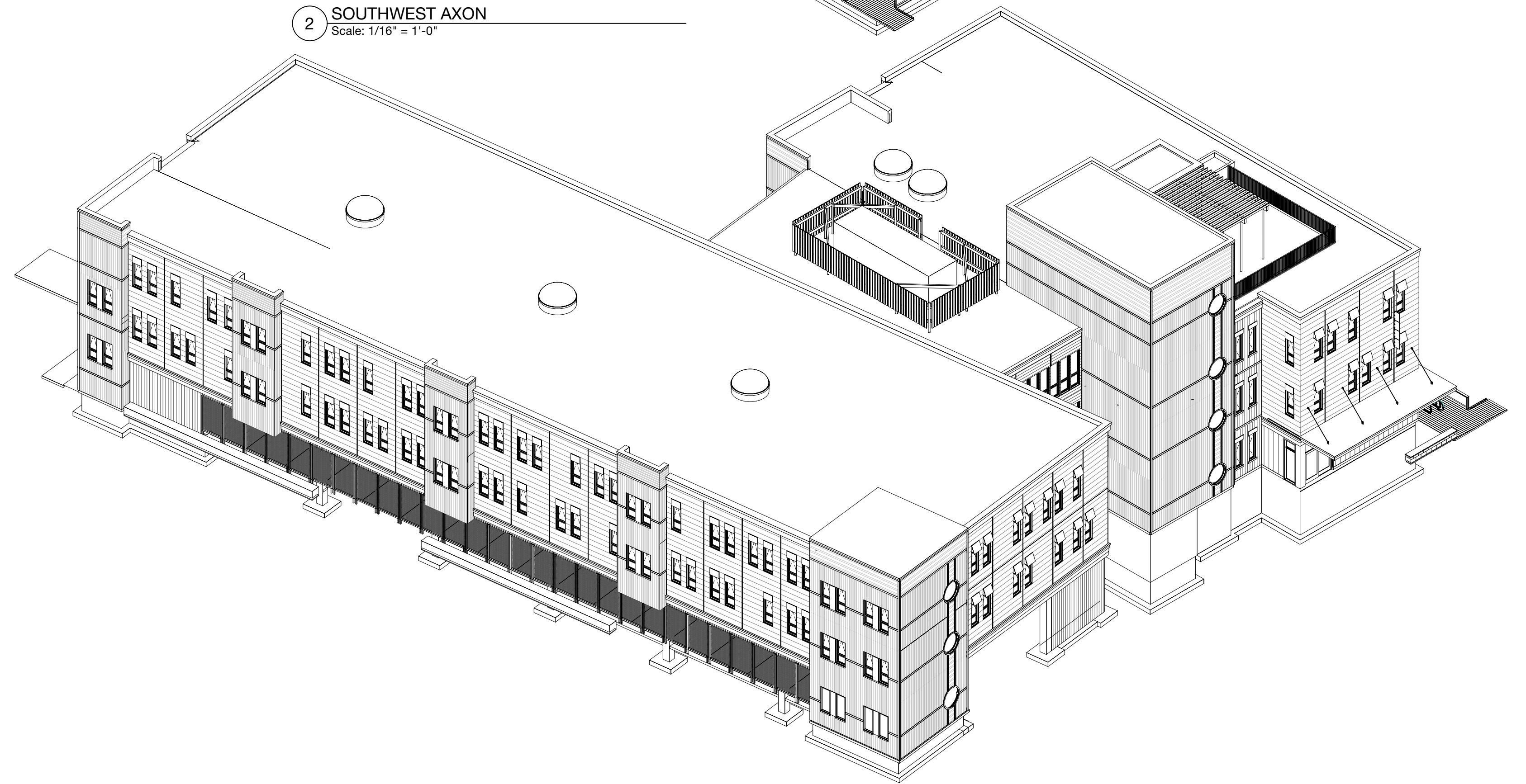
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4 NORTHWEST AXON  
Scale: 1/16" = 1'-0"

# HOWARD CENTER

BURLINGTON, VT

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ZONING PERMIT APPLICATION

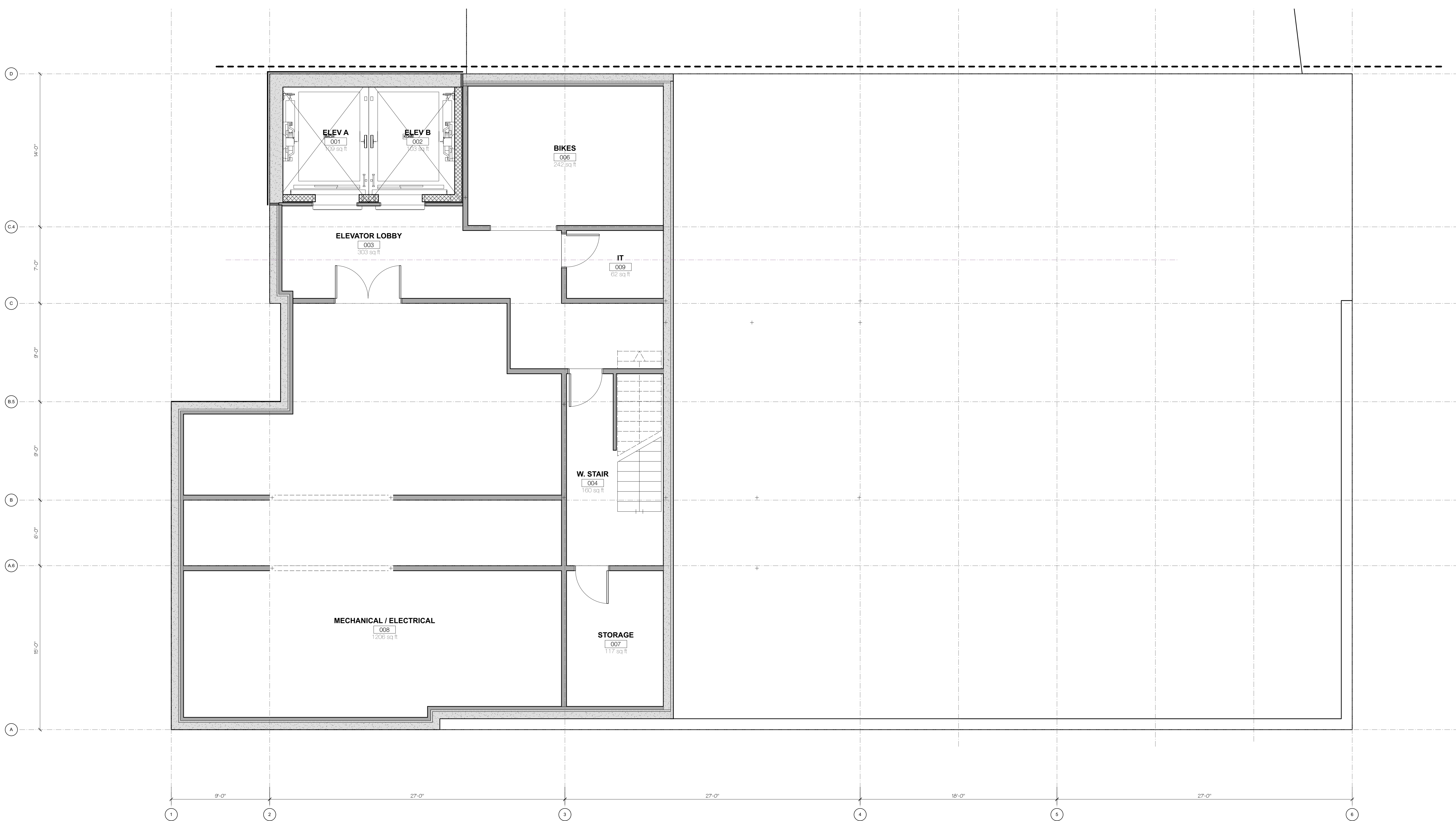
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ARCHITECTURE

255 SOUTH CHAMPLAIN STREET  
BURLINGTON, VERMONT 05401  
T: 802.864.6693

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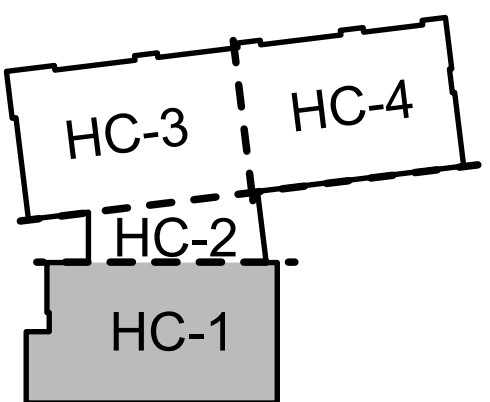
ENLARGED BASEMENT PLAN  
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ZONING PERMIT APPLICATION

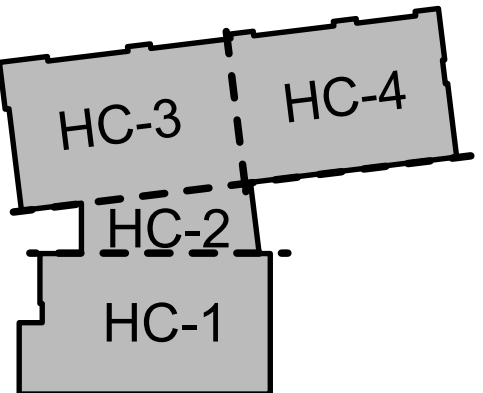
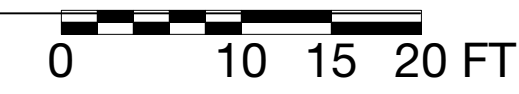








1 SECOND FLOOR PLAN  
Scale: 3/32" = 1'-0"



# HOWARD CENTER

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ZONING PERMIT APPLICATION

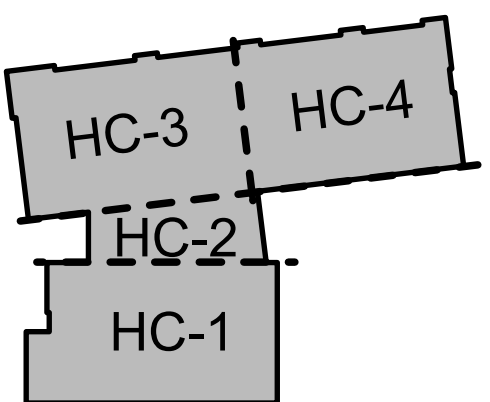
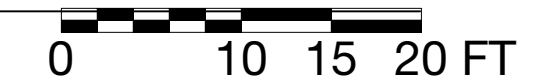
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THIRD FLOOR PLAN  
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# HOWARD CENTER

BURLINGTON, VT

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ZONING PERMIT APPLICATION

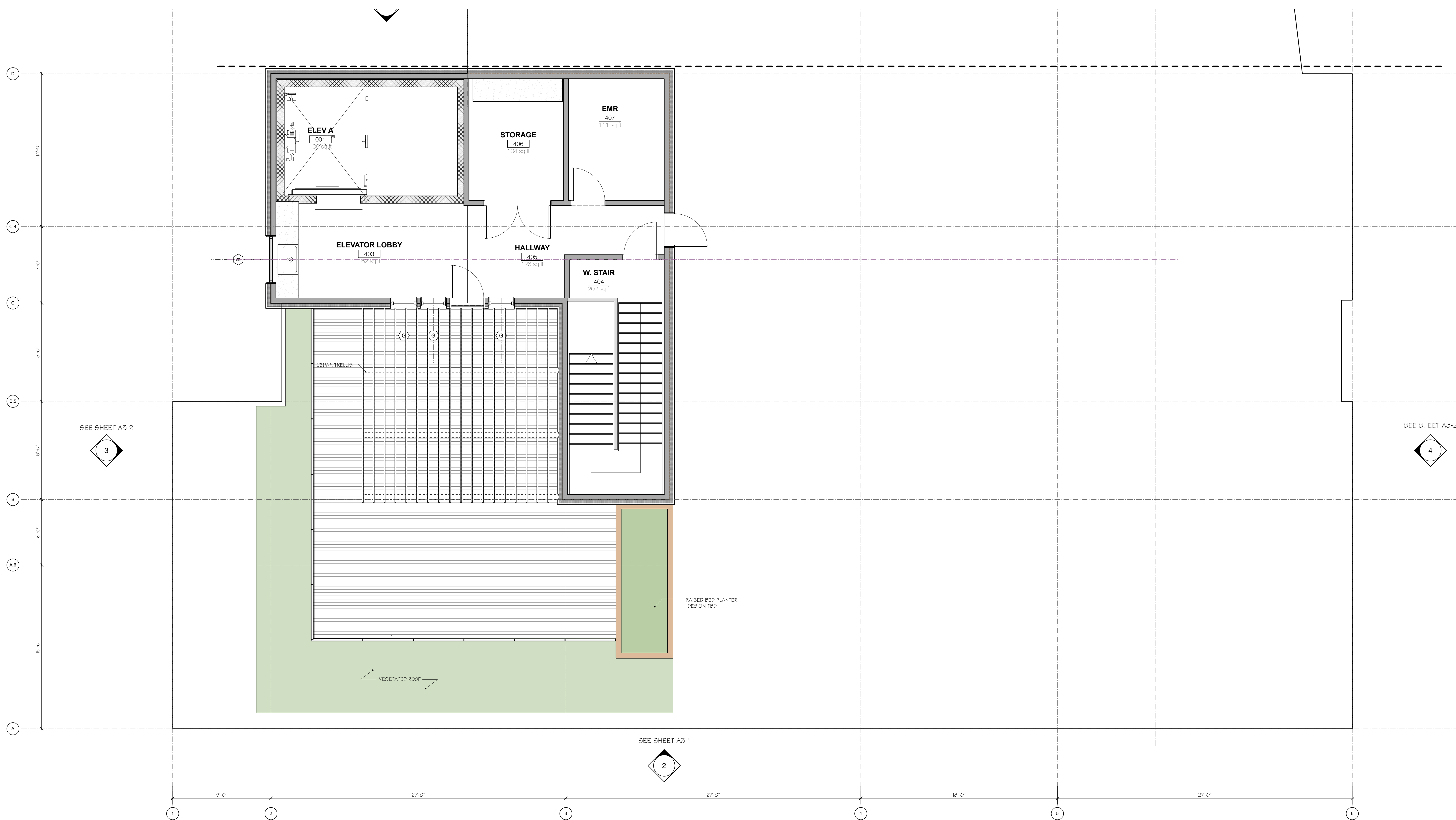
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255 SOUTH CHAMPLAIN STREET  
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T: 802.864.6693

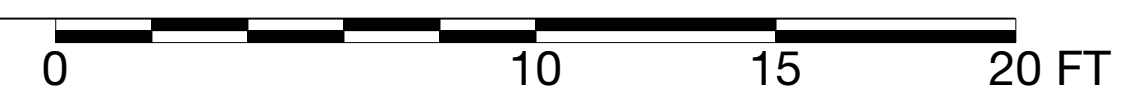
DATE: 08.03.23  
DRAWN: LR, TB

A1-3





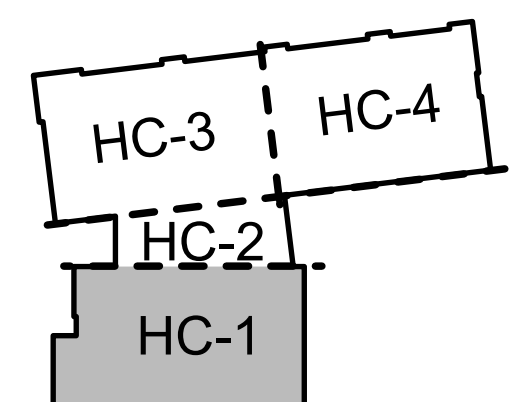
ENLARGED TERRACE PLAN  
Scale: 1/4" = 1'-0"



HOWARD CENTER  
BURLINGTON, VT

Duncan  
Wisniewski  
ARCHITECTURE

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BURLINGTON, VERMONT 05401  
T: 802.864.6693



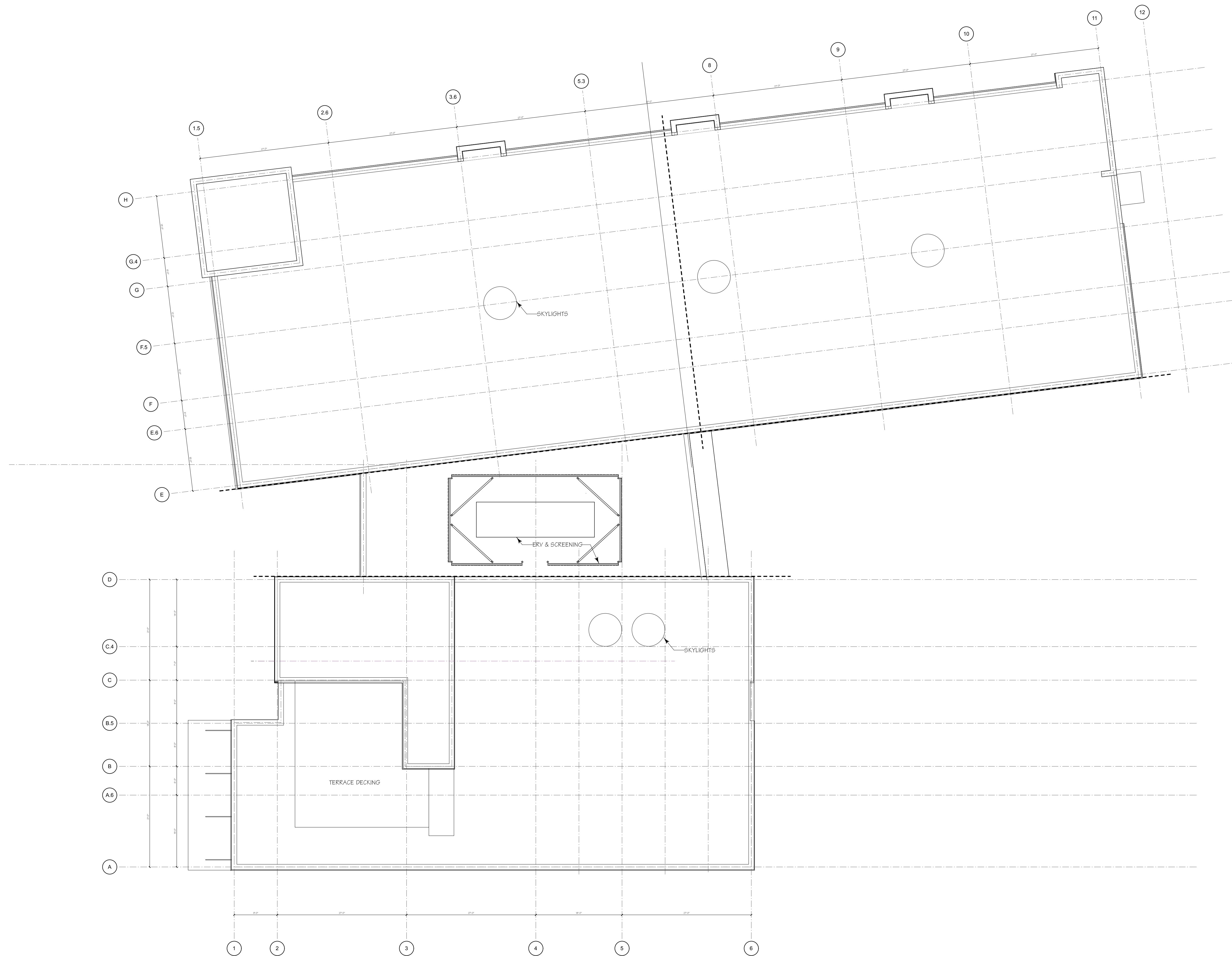
DATE: 08.03.23  
DRAWN: LR

A1-4

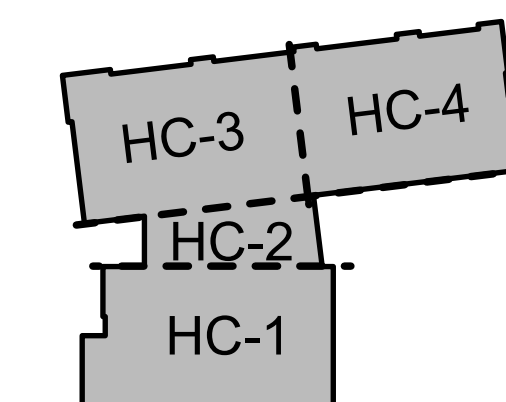
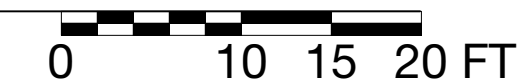
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ROOF PLAN  
Scale: 3/32" = 1'-0"



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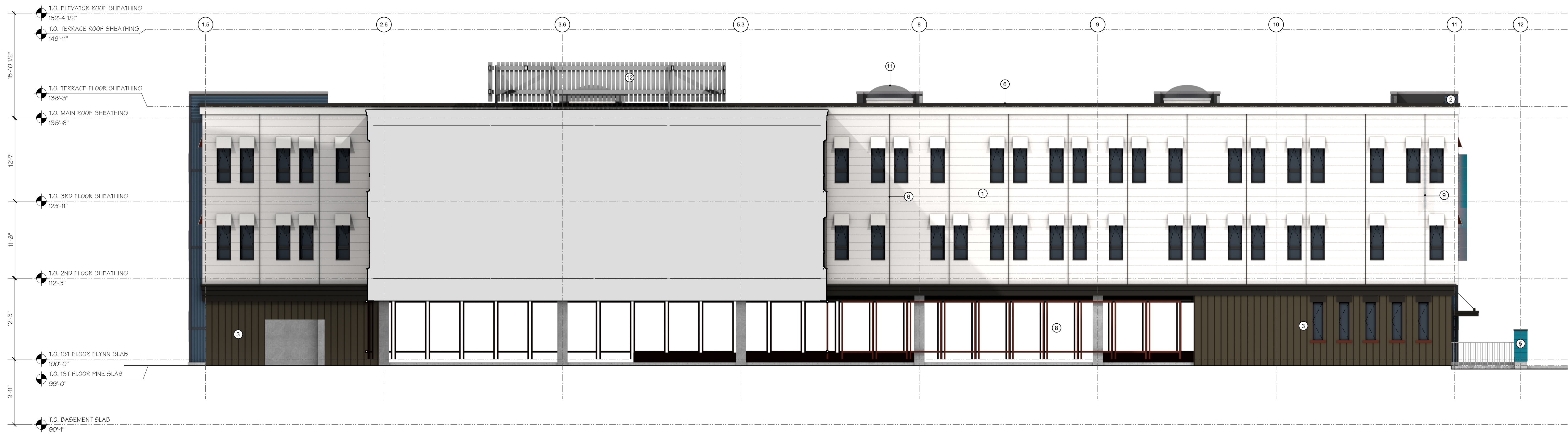
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DATE: 08.03.23  
DRAWN: LR

A1-5





SOUTH SECTION/ELEVATION  
Scale: 1/8" = 1'-0"



SOUTH ELEVATION  
Scale: 1/8" = 1'-0"

| MATERIAL LEGEND |                           |                 |                           |
|-----------------|---------------------------|-----------------|---------------------------|
| ①               | FIBER CEMENT SIDING       | ⑧               | WIRE SCREENING            |
| ②               | HORIZONTAL METAL SIDING B | ⑨               | DICHROIC GLASS PANELS     |
| ③               | VERTICAL METAL SIDING A   | ⑩               | HORIZONTAL METAL SIDING A |
| ④               | VERTICAL METAL SIDING B   | ⑪               | SKYLIGHTS                 |
| ⑤               | GLAZED CMU                | ⑫               | MECHANICAL SCREENING      |
| ⑥               | METAL TRIM                | ⑬               | METAL RAILING             |
| ⑦               | SYNTHETIC TRIM            | COLORS (T.B.D.) |                           |
|                 |                           | Ⓐ               | COLOR - A                 |
|                 |                           | Ⓑ               | COLOR - B                 |
|                 |                           | Ⓒ               | COLOR - C                 |

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T: 802.864.6693

DATE: 08.03.23  
DRAWN: LR

A3-0.0





WEST ELEVATION  
Scale: 1/8" = 1'-0"



EAST ELEVATION  
Scale: 1/8" = 1'-0"

MATERIAL LEGEND

- |                             |                              |
|-----------------------------|------------------------------|
| ① FIBER CEMENT SIDING       | ⑧ WIRE SCREENING             |
| ② HORIZONTAL METAL SIDING B | ⑨ DICHROIC GLASS PANELS      |
| ③ VERTICAL METAL SIDING A   | ⑩ HORIZONTAL METAL SIDING A  |
| ④ VERTICAL METAL SIDING B   | ⑪ SKYLIGHTS                  |
| ⑤ GLAZED CMU                | ⑫ MECHANICAL SCREENING       |
| ⑥ METAL TRIM                | ⑬ METAL RAILING              |
| ⑦ SYNTHETIC TRIM            | <b>COLORS (T.B.D.)</b>       |
|                             | ① COLOR - A      ② COLOR - B |
|                             | ③ COLOR - C                  |

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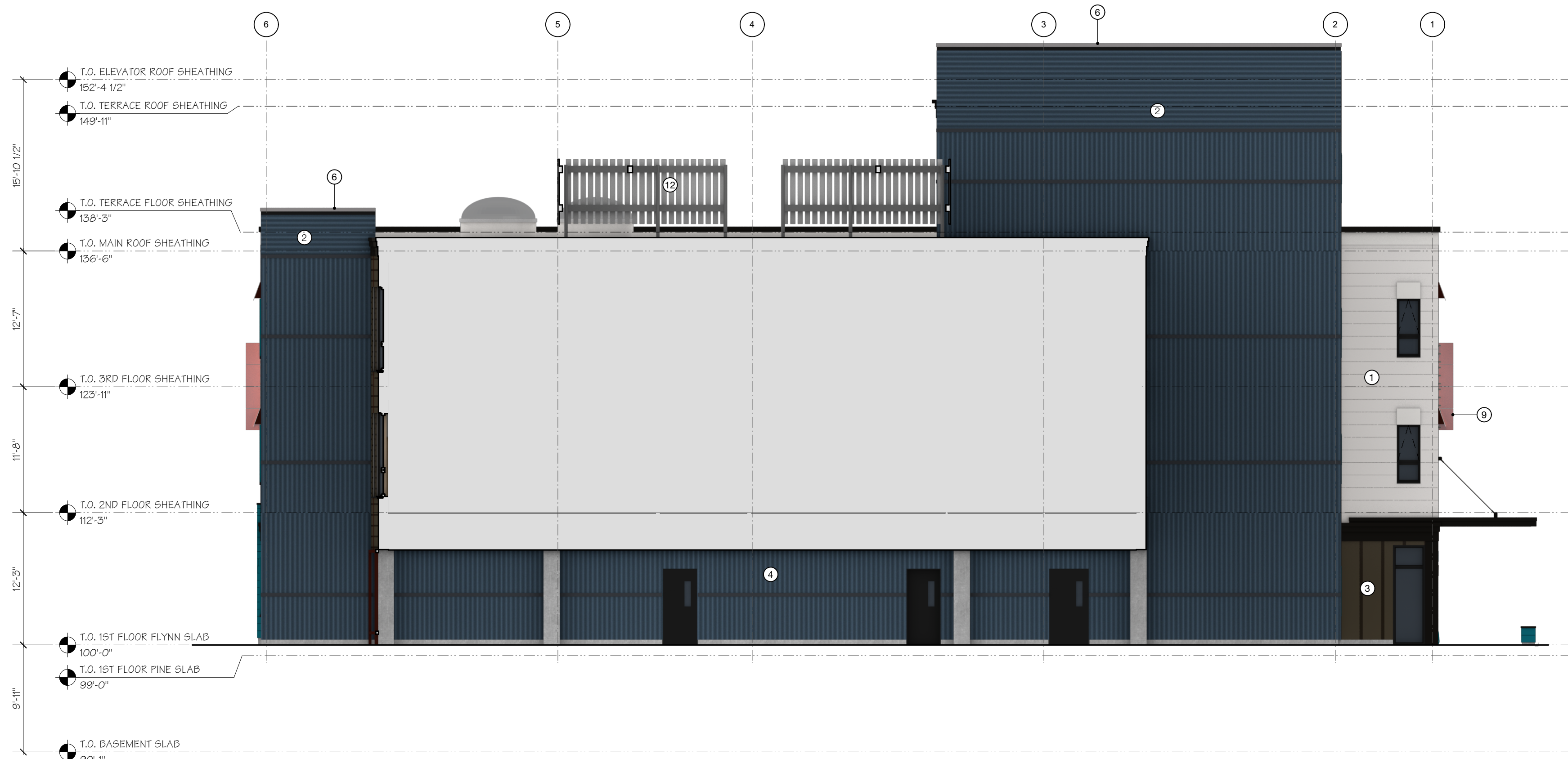
DATE: 08.03.23  
DRAWN: LR

A3-1.0





NORTH ELEVATION  
Scale: 1/8" = 1'-0"



NORTH SECTION/ELEVATION  
Scale: 1/8" = 1'-0"

| MATERIAL LEGEND |                           |                 |                           |
|-----------------|---------------------------|-----------------|---------------------------|
| ①               | FIBER CEMENT SIDING       | ⑧               | WIRE SCREENING            |
| ②               | HORIZONTAL METAL SIDING B | ⑨               | DICHROIC GLASS PANELS     |
| ③               | VERTICAL METAL SIDING A   | ⑩               | HORIZONTAL METAL SIDING A |
| ④               | VERTICAL METAL SIDING B   | ⑪               | SKYLIGHTS                 |
| ⑤               | GLAZED CMU                | ⑫               | MECHANICAL SCREENING      |
| ⑥               | METAL TRIM                | ⑬               | METAL RAILING             |
| ⑦               | SYNTHETIC TRIM            | COLORS (T.B.D.) |                           |
|                 |                           | Ⓐ               | COLOR - A                 |
|                 |                           | Ⓑ               | COLOR - B                 |
|                 |                           | Ⓒ               | COLOR - C                 |

# HOWARD CENTER

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T: 802.864.6693

DATE: 08.03.23  
DRAWN: LR

A3-2.0



## **Architectural Design Standards**

The redevelopment of 300 Flynn Avenue / 855 Pine Street meets the Architectural Design Standards as written in article 6.

### *6.3.2 (a) Relate Development to its environment:*

The proposed massing, height, and scale relate harmoniously with adjacent structures: Flynn Avenue Coop to the west (3 stories), 316 Flynn Avenue to the east (4 stories), and St. Anthony's Church to the north. The proposed low pitch membrane roof is appropriate for the commercial function of the building, and relates to existing low pitch roofs nearby: Champlain School, 316 Flynn, and industrial buildings further west on Flynn (208 Flynn, City Market). Cornices and different parapet heights are employed in the design to provide architectural detail and avoid large expanses of undifferentiated roof forms.

Two fully accessible primary entrances invite the user to the building. The main entrance on Flynn Avenue welcomes most visitors and staff, while the Pine Street entrance serves users coming to the community room space on Pine Street.

Windows are primarily vertical in nature, with some deviations to create visual interest.

### *6.3.2 (b) Protection of Important Architectural Resources:*

N/A

### *6.3.2 (c) Protection of Important Public Views:*

The proposed development does not adversely impact any important public views.

### *6.3.2 (d) Provide an active and inviting street edge:*

Each building elevation employs diverse materials (see e) to create depth on the elevation and create an inviting street edge. Plantings along each street edge provide privacy to users as well as performing stormwater function to pre-treat roof water.

### *6.3.2 (e) Quality of Materials:*

The proposed materials (high density fiber cement and metal siding) have a 50+ year expected useful life, and do not require periodic repainting. Cut sheets of all proposed materials are included in the application.

### *6.3.2 (f) Reduce energy utilization:*

This project will not use any fossil fuels on site. To achieve this, the building will be insulated above code minimums with a goal of meeting the Passive House air sealing requirements. Heating and cooling will be accomplished using geothermal heat pumps. Ventilation is provided using high efficiency balanced ventilation with heat recovery. The central ventilator will be located on the roof and screened from public view. Domestic hot water will utilize air source heat pump technology. The roof has been designed for future rooftop solar. The design team is working with Burlington Electric Department to maximize opportunities for energy efficiency.

### *6.3.2 (g) Make advertising features complementary to the site:*

Signage is illustrated in elevations and renderings. However, the applicant will apply for signage permits separately. Proposed signs will be complementary to the architecture and coordinated with other materials in a harmonious fashion.

### *6.3.2 (h) Integrate infrastructure into the building design:*

Aforementioned rooftop mechanicals will be screened from view with rooftop screening that is complementary to the architectural design. Stormwater infrastructure will be planted and celebrated as part of the Flynn Avenue street edge landscaping.

### *6.3.2 (i) Make spaces secure and safe:*

# HOWARD CENTER

## Site Plan Application Narratives

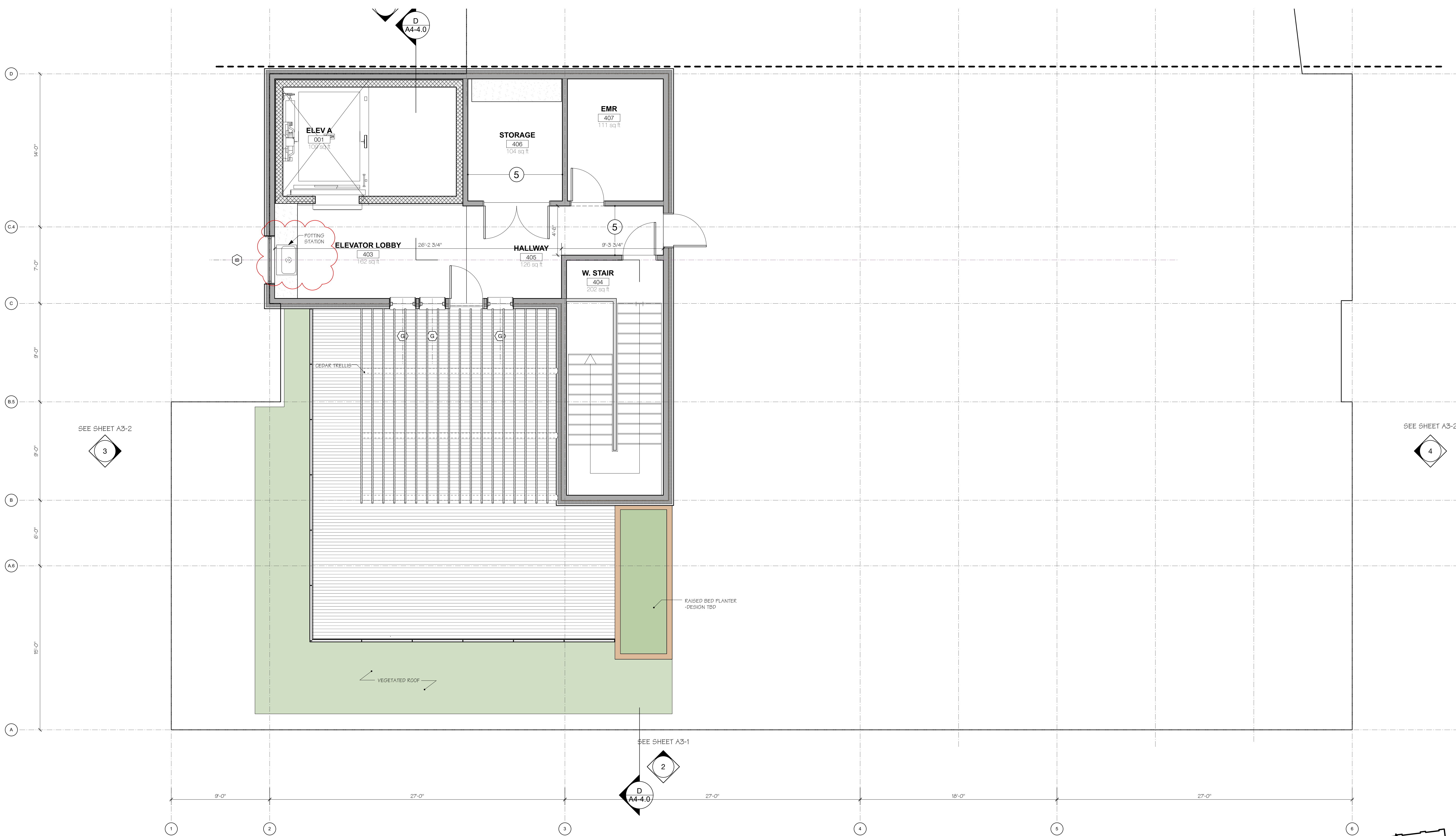
DATE: August 23, 2023

Safety and security for staff and clients is of utmost importance to Howard Center. To those ends, parking lot and parking garage lighting will be as bright as possible (while meeting Burlington's lighting limits) to create a safe environment. Emergency vehicle access, including fire truck radii analysis, has been incorporated into the design. The design team has reviewed the design with the Burlington Fire Marshal.

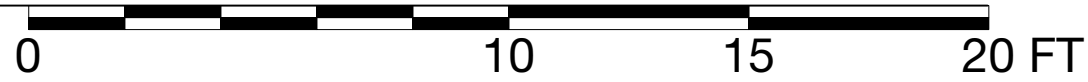
### Building Height Variation

Per Article 5.2.6 (c) 6 - the applicant requests consideration for a 5% variation in the allowable building height to account for grade changes across the site. The building's main finish floor elevation (FFE) is measured at 146', at the primary facade facing Flynn Avenue. The zoning ordinance allows 35' in this district, and we are requesting the additional 1'-6" to assist the team with managing the grades as they modulate towards Englesby Brook. The additional height will enable the building to better support the fully electric air based building systems we need to provide the clients and staff with good indoor air quality.

*Sam*



ENLARGED TERRACE PLAN  
Scale: 1/4" = 1'-0"

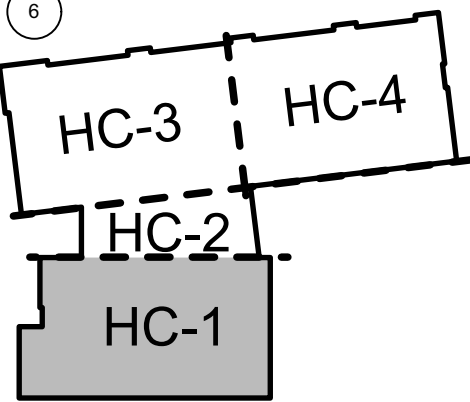


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PERMIT SET



DATE: 09.06.23  
DRAWN: LR, TB

A1-4.1

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FLYNN AVENUE PARKING LOT



VIEW FROM FLYNN AVENUE PARKING LOT



FLYNN AVENUE ENTRANCE



NEIGHBORING BUILDING





VIEW FROM FLYNN AVENUE



VIEW FROM PINE STREET



PINE STREET PARKING LOT AND ENTRANCE



WALKWAY BEHIND BUILDING





VIEW TO FLYNN AVENUE PARKING LOT



NORTH SIDE OF BUILDING



EXISTING FLYNN AVENUE PARKING LOT





FLYNN AVENUE PARKING LOT



VIEW FROM FLYNN AVENUE PARKING LOT



FLYNN AVENUE ENTRANCE



NEIGHBORING BUILDING





VIEW FROM FLYNN AVENUE



VIEW FROM PINE STREET



PINE STREET PARKING LOT AND ENTRANCE



WALKWAY BEHIND BUILDING





VIEW TO FLYNN AVENUE PARKING LOT



NORTH SIDE OF BUILDING



EXISTING FLYNN AVENUE PARKING LOT





**Howard Center  
Redevelopment Project**  
855 Pine Street/300 Flynn Avenue  
Burlington, Vermont

| No. | Revision | Date | Apprv. |
|-----|----------|------|--------|
|     |          |      |        |
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|                                  |                   |
|----------------------------------|-------------------|
| Designed by<br>mkw               | Checked by<br>mkw |
| Issued for<br>Permit Application | Date<br>8/3/2023  |

Not For Construction

Drawing Title

Landscape Layout Plan

Drawing Number

L1.00

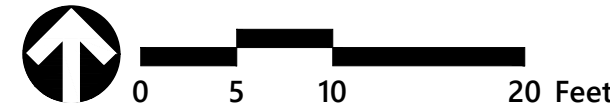




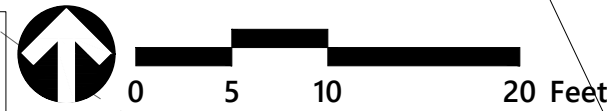
| <u>DECIDUOUS TREES</u>    |     | <u>BOTANICAL NAME</u>                      | <u>COMMON NAME</u>               | <u>SIZE</u>         |
|---------------------------|-----|--------------------------------------------|----------------------------------|---------------------|
| ARA                       | 1   | Acer rubrum 'Armstrong'                    | Armstrong Red Maple              | 2 1/2 - 3" CAL.     |
| AF                        | 5   | Acer x freemanii 'Sienna'                  | Sienna Glen Maple                | 2 1/2 - 3" CAL.     |
| TB                        | 2   | Tilia americana 'Baillyard'                | Frontyard® American Linden       | 2 1/2 - 3" CAL/ B&B |
| <u>SHRUBS</u>             |     | <u>BOTANICAL NAME</u>                      | <u>COMMON NAME</u>               | <u>SIZE</u>         |
| CSK                       | 51  | Cornus sericea 'Kelsey'                    | Kelsey Dogwood                   | 18 - 24" SPD        |
| JP2                       | 10  | Juniperus horizontalis 'Plumosa Compacta'  | Creeping Juniper                 | 18 - 24" SPD        |
| MD                        | 7   | Microbiota decussata                       | Russian Cypress                  | 18 - 24" SPD        |
| <u>ORNAMENTAL GRASSES</u> |     | <u>BOTANICAL NAME</u>                      | <u>COMMON NAME</u>               | <u>SIZE</u>         |
| CA                        | 123 | Calamagrostis x acutiflora 'Karl Foerster' | Karl Foerster Feather Reed Grass | 2 GAL.              |
| PVS                       | 61  | Panicum virgatum 'Shenandoah'              | Shenandoah Switch Grass          | 2 GAL.              |
| SS3                       | 33  | Schizachyrium scoparium 'Standing Ovation' | Standing Ovation Little Bluestem | 2 GAL.              |
| SH                        | 32  | Sporobolus heterolepis                     | Prairie Dropseed                 | 2 GAL.              |
| <u>PERENNIALS</u>         |     | <u>BOTANICAL NAME</u>                      | <u>COMMON NAME</u>               | <u>SIZE</u>         |
| CC3                       | 12  | Chrysanthemum coccineum 'Robinson's Pink'  | Robinson's Pink Painted Daisy    | 1 GAL., 18" o.c.    |
| NF                        | 17  | Nepeta x faassenii                         | Catmint                          | 1 GAL., 24" o.c.    |
| RM                        | 41  | Rudbeckia hirta 'Marmalade'                | Marmalade Black-eyed Susan       | 1 GAL., 24" o.c.    |
| SV                        | 19  | Salvia nemorosa 'Pink Profusion'           | Pink Profusion Meadow Sage       | 1 GAL.              |
| SA                        | 61  | Sedum x 'Autumn Joy'                       | Autumn Joy Sedum                 | 1 GAL.              |

- Notes:
1. CONTRACTOR IS RESPONSIBLE TO VERIFY ALL PLANT QUANTITIES FOUND IN THE PLANTING PLANS. IF ANY DISCREPANCIES ARE FOUND, LANDSCAPE ARCHITECT SHOULD BE NOTIFIED IMMEDIATELY.
  2. FINAL LAYOUT AND PLACEMENT OF ALL PLANT MATERIAL TO BE APPROVED BY THE LANDSCAPE ARCHITECT.
  3. CONTRACTOR IS RESPONSIBLE TO SEED ALL DISTURBED AREAS ACCORDING TO THE SPECIFICATIONS AND LAWN DETAIL.
  4. REFER TO PLANT MATERIAL INSTALLATION DETAILS AND SPECIFICATIONS.
  5. IF THE LANDSCAPE CONTRACTOR PROPOSES A SUBSTITUTE PLANT SPECIES, ALL SUBSTITUTES NEED TO BE APPROVED BY THE LANDSCAPE ARCHITECT IN WRITING PRIOR TO ORDERING.

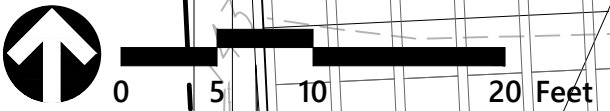




# PLANTING PLAN ENLARGEMENT - A



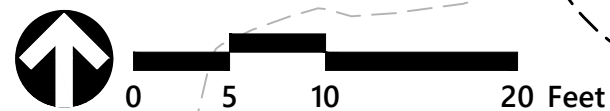
# PLANTING PLAN ENLARGEMENT - C



# PLANTING PLAN ENLARGEMENT - D



# PLANTING PLAN ENLARGEMENT - E



# PLANTING PLAN ENLARGEMENT - B

## PLANT SCHEDULE

| <u>DECIDUOUS TREES</u>    |     | QTY | BOTANICAL NAME                             | COMMON NAME                      | SIZE                  |
|---------------------------|-----|-----|--------------------------------------------|----------------------------------|-----------------------|
| ARA                       | 1   |     | Acer rubrum 'Armstrong'                    | Armstrong Red Maple              | 2 1/2 - 3' CAL.       |
| AF                        | 5   |     | Acer x freemanii 'Sienna'                  | Sienna Glen Maple                | 2 1/2 - 3' CAL.       |
| TB                        | 2   |     | Tilia americana 'Baileyard'                | Frontyard® American Linden       | 2 1/2 - 3' CAL. / B&B |
| <u>SHRUBS</u>             |     | QTY | BOTANICAL NAME                             | COMMON NAME                      | SIZE                  |
|                           | 51  |     | Cornus sericea 'Kelsey'                    | Kelsey Dogwood                   | 18 - 24" SPD          |
| JP2                       | 10  |     | Juniperus horizontalis 'Plumosa Compacta'  | Creeping Juniper                 | 18 - 24" SPD          |
| MD                        | 7   |     | Microbiota decussata                       | Russian Cypress                  | 18 - 24" SPD          |
| <u>ORNAMENTAL GRASSES</u> |     | QTY | BOTANICAL NAME                             | COMMON NAME                      | SIZE                  |
| CA                        | 123 |     | Calamagrostis x acutiflora 'Karl Foerster' | Karl Foerster Feather Reed Grass | 2 GAL.                |
| PVS                       | 61  |     | Panicum virgatum 'Shenandoah'              | Shenandoah Switch Grass          | 2 GAL.                |
| SS3                       | 33  |     | Schizachyrium scoparium 'Standing Ovation' | Standing Ovation Little Bluestem | 2 GAL.                |
| SH                        | 32  |     | Sporobolus heterolepis                     | Prairie Dropseed                 | 2 GAL.                |
| <u>PERENNIALS</u>         |     | QTY | BOTANICAL NAME                             | COMMON NAME                      | SIZE                  |
| CC3                       | 12  |     | Phrysanthemum coccineum 'Robinson's Pink'  | Robinson's Pink Painted Daisy    | 1 GAL, 18" o.c.       |
| NF                        | 17  |     | Nepeta x faassenii                         | Catmint                          | 1 GAL, 24" o.c.       |
| RM                        | 41  |     | Rudbeckia hirta 'Marmalade'                | Marmalade Black-eyed Susan       | 1 GAL, 24" o.c.       |
| SV                        | 19  |     | Salvia nemorosa 'Pink Profusion'           | Pink Profusion Meadow Sage       | 1 GAL.                |
| SA                        | 61  |     | Sedum x 'Autumn Joy'                       | Autumn Joy Sedum                 | 1 GAL.                |

Notes:

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5. IF THE LANDSCAPE CONTRACTOR PROPOSES A SUBSTITUTE PLANT SPECIES, ALL SUBSTITUTES NEED TO BE APPROVED BY THE LANDSCAPE ARCHITECT IN WRITING PRIOR TO ORDERING.

**Howard Center  
Redevelopment Project**  
855 Pine Street/300 Flynn Avenue  
Burlington, Vermont

| No. | Revision | Date | Appvd. |
|-----|----------|------|--------|
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Designed by **mkw** Checked by **mkw**

Permit Application 8/3/2023

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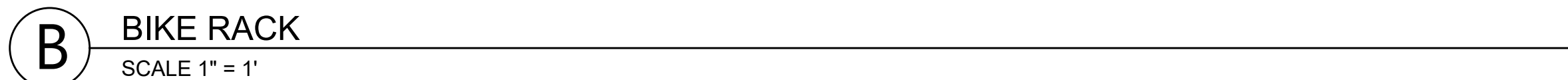
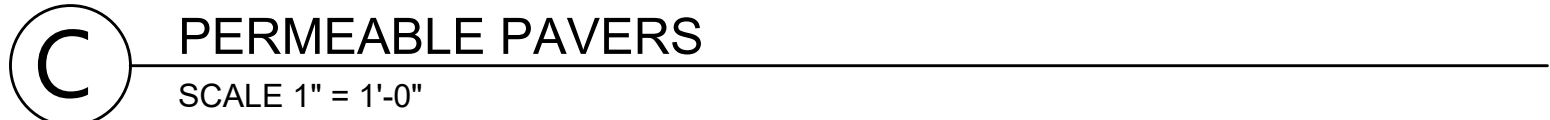
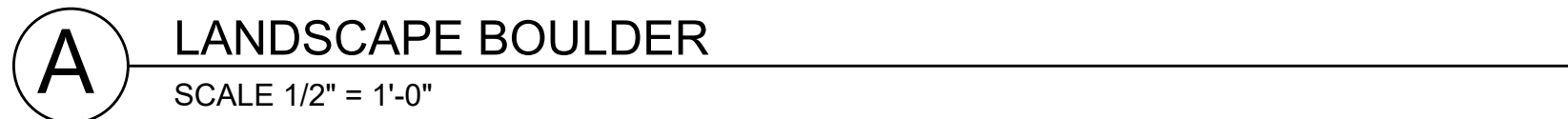
Drawing Title

## Planting Plan Enlargements

### Drawing Numbers

## L2.01





## L3.00





| No. | Revision | Date | Appvd. |
|-----|----------|------|--------|
|-----|----------|------|--------|

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|---------------------------|--------------------------|
| Designed by<br><b>mkw</b> | Checked by<br><b>mkw</b> |
| Issued for                | Date                     |

Permit Application 8/3/2023

Not For Construction

# Drawing Title

Drawing Number

**L4.00**

## LIGHT FIXTURE AND POLE SPECIFICATIONS

|                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Fixture A</b><br/> <b>Manufacturer:</b> Brownlee<br/> <b>Fixture:</b> Penny-OD<br/> <b>LED Engine:</b> 16w L Series LED<br/> <b>Color Temperature:</b> 3,000k<br/> <b>Mounting:</b> Ceiling Mounted</p>                                 | <p><b>Fixture D</b><br/> <b>Manufacturer:</b> Eureka<br/> <b>Fixture:</b> Luz 10094<br/> <b>LED Engine:</b> 1w LED<br/> <b>Color Temperature:</b> 3,000k<br/> <b>Color:</b> Black Texture<br/> <b>Mounting:</b> Wall - 1.5ft</p>                                                                           |
| <p><b>Fixture B</b><br/> <b>Manufacturer:</b> Eureka<br/> <b>Fixture:</b> Cliff - 3419<br/> <b>LED Engine:</b> HO<br/> <b>Color Temperature:</b> 3,000k<br/> <b>Color:</b> Black Texture<br/> <b>Mounting:</b> Wall - 8-10ft</p>              | <p><b>Fixture E</b><br/> <b>Manufacturer:</b> Beacon Lighting<br/> <b>Fixture:</b> VPL<br/> <b>LED Engine:</b> 160L-100<br/> <b>Color Temperature:</b> 3,000k<br/> <b>Distribution:</b> Type 3<br/> <b>Configuration:</b> Single<br/> <b>Finish:</b> Black Matte Textured<br/> <b>Pole Height:</b> 22'</p> |
| <p><b>Fixture C</b><br/> <b>Manufacturer:</b> Equinox 3411<br/> <b>Fixture:</b> Eureka<br/> <b>LED Engine:</b> 2xLED2 - Narrow<br/> <b>Color Temperature:</b> 3,000k<br/> <b>Color:</b> Black Texture<br/> <b>Mounting:</b> Wall - 8-10ft</p> | <p><b>Fixture F</b><br/> <b>Manufacturer:</b> Beacon Lighting<br/> <b>Fixture:</b> VPL<br/> <b>LED Engine:</b> 160L-100<br/> <b>Color Temperature:</b> 3,000k<br/> <b>Distribution:</b> Type 3<br/> <b>Configuration:</b> Twin<br/> <b>Finish:</b> Black Matte Textured<br/> <b>Pole Height:</b> 22'</p>   |



## STATISTICAL AREA SUMMARY

Grid Type: Horizontal Illuminance at finish grade.  
Grid Units: Footcandles

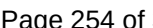
| Statistical Area  | Avg  | Max  | Min  | Avg/Min | Max/Min |
|-------------------|------|------|------|---------|---------|
| 1 Parking Lot - A | 1.55 | 3.50 | 0.10 | 15.50   | 35.00   |
| 2 Parking Lot - B | 1.93 | 3.10 | 0.90 | 2.14    | 3.44    |

Statistical Boundary 

Disclaimer:

This analysis was calculated in accordance with published IES calculation methods and procedures with the data as entered by the user. This analysis is based on tested IES photometric data, light loss factors as defined in the LLF value. This analysis is a mathematical model of real life situations, and it can be only as accurate as the model itself. Calculated values may vary from actual measurements in certain situations. VHB is not responsible for light output deviations due to light source, or other variables.





Page 254 of



## V1.0 – 2021.10

## VI.0-2017-1

## Drawing Number

Project Number  
3887.00







## MEMORANDUM

To: Burlington Development Review Board  
Mary O’Neil, Principal Planner  
Scott Gustin, Principal Planner & Asst. Administrative Officer

From: Joe Weith, Senior Project Manager

Date: August 10, 2023

Re: Howard Center 300 Flynn Redevelopment – Project Narrative

Howard Center is proposing to redevelop their property located at 300 Flynn Avenue. This narrative provides a brief description of the project and addresses several key design aspects and regulatory requirements as outlined in the Burlington Comprehensive Development Ordinance (“CDO”).

### **Project Description**

The 300 Flynn Redevelopment project will involve demolition of the existing approximately 24,042 square foot building and construction of a new 3 story, approximately 50,100 square foot building. The current and proposed use of the property is a combination of mental health crisis center and related medical and general office uses. Mental health crisis center is a conditional use in the underlying zoning district.

Howard Center and the project team met with the Ward 5 NPA on December 15, 2022, the City’s Technical Review Committee on February 9, 2023, and the Development Review Board (“DRB”) on May 16, 2023 for sketch plan review.



## **Dimensional Standards and Density**

**Zoning District:** The underlying zoning district is Neighborhood Mixed-Use (NMU).

**Overlay Districts:** Design Review Overlay District; Natural Resource Protection including the Riparian and Littoral Conservation Zone along Englesby Brook and the Wetland Conservation Zone for the wetland along Englesby Brook.

**Building Setbacks:** Proposed building setbacks: 11feet from Flynn Avenue (10 foot minimum required), 18 feet from Pine Street (10 foot minimum required), 104 feet from the west property line (zero feet minimum required), 164 feet from north property line (zero feet minimum required), and 3.4 feet from southeast property line (zero feet minimum required).

**Lot Coverage:** The proposed lot coverage is 58% (80% maximum lot coverage allowed).

**Building Height:** The proposed building height is 36.5 feet as measured from the building's main finish floor elevation (FFE) of the primary facade facing Flynn Avenue (see South Elevation on A3-0.0 for the measurement of building height). Maximum allowable building height in the NMU District is 35 feet. Per Article 5.2.6(c)(6) of the CDO, the applicant requests consideration for a 5% variation in the allowable building height to account for grade changes across the site. An additional 1.5 feet in building height will help the design team with managing the grades as they modulate towards Englesby Brook and will enable the building to better support the fully electric air-based building systems needed to provide the clients and staff with good indoor air quality.

## **Parking**

**Vehicle Parking:** The property is located within the Multi-Modal Mixed Use Parking District. Table 8.1.9-1 of the CDO does not list a maximum off-street parking requirement for mental health crisis centers. The land use category most similar to mental health crisis center for parking purposes is "crisis counseling center", which allows maximum parking of 3 spaces per 1,000 gfa. The programmed use of the building will be a blend of scheduled outpatient services and unscheduled, drop in, as needed services. The latter relates primarily to our crisis services and intake services which will be located at this site with a visitor flow that more closely aligns with the "crisis counseling center" use.

The maximum allowable number of on-site parking spaces is 150 (50,100 sf / 1,000 sf x 3 spaces = 150). The project proposes 106 total on-site parking spaces including 5 ADA accessible spaces, 2 EV charging spaces, and 8 tandem spaces. The total number of proposed parking spaces that count toward the maximum allowed is 99.

**Bicycle Parking:** Section 8.2.4 of the CDO requires 6 short term (50,100 sf / 8,000 sf = 6) and 10 long term (50,100 / 5,000 sf = 10) bike parking spaces for this project. For short-term bike

parking, 3 U-racks (6 bike parking spaces) are proposed near the main entrance on Flynn Avenue and 2 U-racks (4 bike parking spaces) are proposed near the entrance on Pine Street for a total of 10 short-term parking spaces. A minimum of 10 long term bike parking spaces will be accommodated in the basement (see basement floor plan Sheet A1-0 in architectural plan set).

### **Traffic/Transportation**

As indicated in the attached Howard Center Traffic Analysis memo prepared by VHB and dated 8/9/23, the project is projected to produce 52 net new trips in the AM peak hour and 60 net new trips in the PM peak hour compared to existing conditions. While VTrans and Burlington Public Works (“BPW”) policy does not require a traffic study if the net increase in peak hour trip ends is less than 75, Howard Center went ahead and analyzed the project’s potential impact on the Pine Street/Flynn Avenue intersection. With conservative assumptions regarding mode split and trip distribution, the new trips are expected to have minimal effect on the intersection. An overall Level of Service B is expected to remain in the Build condition for the AM and PM peak hours. The Traffic Analysis memo concludes that the project is not anticipated to generate unreasonable congestion conditions on the adjacent roadway network.

As shown on Sheet C2.0 of the civil plan set, the existing bus stop on Pine Street will be relocated several feet to the south. GMT has approved relocation of the bus stop as proposed.

### **Transportation Demand Management Plan**

Attached is a Transportation Demand Management (TDM) plan for the project.

### **Stormwater**

The proposed stormwater management plan will significantly improve the detention and treatment of stormwater on the site compared to existing conditions. The stormwater management plan involves the installation of practices to both treat and detain runoff from the site to reduce pollutant load and peak flows to Englesby Brook and the surrounding wetland. Stormwater from the building roof and parking areas will be directed to high-flow vegetated filters which will provide water quality treatment. The water will then flow into a system of buried chambers which have a controlled outlet. This system allows for the slow release of stormwater back towards the wetland without increasing peak flows. This proposed system surpasses the plan outlined in the Englesby Brook Flow Restoration Plan.

The stormwater management and EPSC plans, detail sheets and the attached Stormwater General Permit Narrative have been submitted to and have been preliminarily reviewed by James Sherard at the City’s Stormwater Division.

## **Natural Resource Protection**

As shown on the attached civil plans, the northern portion of the site is comprised of Englesby Brook and an associated Class II wetland. The limits of the wetland were delineated by Gilman & Briggs Environmental and are depicted on the plan. The plan also shows the limits of the state's regulated 50-foot wetland buffer and the City's 100-foot wetland and riparian and littoral conservation zones.

The project reduces the area of impact to the 50' wetland buffer zone, 100' wetland buffer zone, and 100' riparian buffer zone compared to the existing site (see zoning table on Sheet C0.0 in the civil plan set). The tree line will not be significantly altered, and best management practices will be used to prevent erosion and control sedimentation during construction. In addition, the stormwater management system will effectively treat runoff before it enters the wetland/riparian buffer zones and control the release of runoff to protect the existing stream channel.

Attached is a wetland and natural resources evaluation memorandum prepared by Gilman & Briggs. Gilman & Briggs concluded that the project is well designed with better water quality infrastructure than currently exists and there will be no negative impact to the wetland, wetland buffer or natural resource areas.

## **Steep Slopes**

Areas of steep slopes exist on the site beginning just beyond the existing development and sloping down to and ending at the wetland surrounding Englesby Brook (see sheets C1.0 and C2.0 in the civil plan set). The intent of the site design is to minimize disturbance and avoid encroachment into this area to the extent practicable. Work within areas of steep slopes will be extremely minimal and will involve removal of three existing drainage pipes which discharge midway down the slope. Minimal grade changes (~200 SF) are proposed near the Pine Street parking lot to convey more area to stormwater treatment and away from the municipal system. All disturbed areas will be backfilled or fine graded, seeded, and covered with erosion control matting. No difference to the overall area of steep slopes is proposed in the pre and post site condition.

## **Architectural Design**

See attached architectural design narrative prepared by Duncan Wisniewski Architects.

## **Energy Efficiency/Sustainability**

The project will not use any fossil fuels on site. To achieve this, the building will be insulated above code minimums with a goal of meeting the Passive House air sealing requirements. Heating and cooling will be accomplished using geothermal heat pumps. Ventilation is provided using high efficiency balanced ventilation with heat recovery. The central ventilator will be located on the roof and screened from public view. Domestic hot water will utilize air source heat pump technology. The roof has been designed for future rooftop solar. The design team is working with Burlington Electric Department to maximize opportunities for energy efficiency.



## **Landscaping and Lighting**

The attached landscape planting plan (sheets L2.00 and L2.01 in LA plan set) proposes a mix of trees, shrubs, ornamental grasses and perennials. Eight (8) new shade trees are proposed within and around the Flynn Avenue parking lot. The plan also proposes to save the existing, large, mature tree along the west property line. The 8 new trees plus the existing mature tree complies with the shading requirements for parking lots and the intent of the regulations as it relates to the number of trees for parking lots.

A photometric lighting plan, light fixture and pole specifications, and lighting statistical area summary are provided on sheets L4.00 – L4.02 in the LA plan set.

## **Conditional Use Criteria**

***Existing or planned public utilities, facilities or services:*** The project will not introduce any identified adverse impacts on public utilities, facilities or services in the area. The project team has met with DPW, BED and GMT to review the project and get their input regarding utilities and services for the project. The stormwater management system will significantly improve management and treatment of stormwater compared to existing conditions.

### ***Character of the area as defined in the zoning ordinance and the municipal development plan:***

The project is compatible with the purpose of the Neighborhood Mixed Use District as it will preserve and enhance a historically mixed commercial/residential area while reinforcing the compact scale and development pattern within the neighborhood. The proposed use will provide employment opportunities within walking or biking distance of the nearby residential neighborhoods. The project will further several goals/objectives contained in the plan including coordination of land use and development with availability and capacity of public services, facilities and utilities, and enable the provision of treatment facilities in accessible locations for residents who need them.

***Nuisance impacts from noise, odor, dust, heat, and vibrations:*** The project will continue and expand the existing use of the property to accommodate the range of caregivers and providers on staff. No additional impacts to the zoning district are anticipated.

***Transportation system capable of supporting the proposed use in addition to the existing uses in the area:*** As indicated in the Howard Center Traffic Analysis memo prepared by VHB dated 8/9/12, the project is not anticipated to generate unreasonable congestion conditions on the adjacent roadway network. Howard Center will also implement the TDM plan which will reduce the need for parking and vehicular travel to and from the site.

***Utilization of renewable energy resources:*** The project will not result in an undue adverse effect on the utilization of renewable energy resources. As stated in the Energy Efficiency/Sustainability section above, the project will not use any fossil fuels on site. The building will be insulated above code minimums with a goal of meeting the Passive House air sealing requirements and heating/cooling will be accomplished using geothermal heat pumps.

Domestic hot water will utilize electric air source heat pump technology. The roof has been designed for future rooftop solar.

***Standards or factors set forth in City bylaws and city and state ordinances:*** The project will comply with all City bylaws and city and state ordinances.



**Howard Center  
300 Flynn Redevelopment Project  
Transportation Demand Management Plan  
8/1/23**

**Background**

Howard Center is proposing to redevelop their property at 300 Flynn Avenue. The project will involve demolition of the existing approximately 24,000 square foot building and construction of a new 3 story, approximately 50,100 square foot building. The property will continue to be used for various mental health services and programs provided by Howard Center. In addition to the programs currently housed on the property, other programs which are currently located at other sites in Burlington and Chittenden County will be relocated to and consolidated on this strategically located property in Burlington.

**Project Transportation Demand Management (TDM) Amenities**

In addition to the TDM program and strategies discussed below, there are several TDM amenities which will be incorporated into the project. These include:

Bicycle Parking – The project will provide a total of 20 bicycle parking spaces on the property. 6 outdoor bike parking spaces are proposed near the main entrance on Flynn Avenue and 4 bike parking spaces are proposed near the entrance on Pine Street. A minimum of 10 long-term bike parking spaces will be accommodated in the basement of the building.

Bus Stop – A bus stop and shelter will be maintained directly in front of the building on Pine Street. The GMT #5 Pine Street route runs every 30 minutes during the week between 6:30 am and 6:30 pm.

Bicycle Lanes – Bike lanes currently exist along Pine Street (northbound and southbound) and Flynn Avenue (westbound and eastbound).





Sidewalks – Sidewalks currently exist along both sides of Pine Street and Flynn Avenue. Both entrances to the building (Flynn Avenue and Pine Street) are oriented to the public ROW to promote convenient access for pedestrians.

Shuttle Service - Additional efforts to reduce parking demand include utilizing the Special Services Transportation Agency (SSTA) and Champlain Islanders Developing Essential Resources (C.I.D.E.R) services. SSTA is a private not-for-profit organization providing transportation services within Chittenden County to the elderly and people with disabilities. C.I.D.E.R. provides similar transportation options for residents of Grand Isle County. Both organizations offer caring, creative, client centered, cost effective, and community-based transportation services. Howard Center clients utilize these transportation options on a consistent and ongoing basis.

### **TDM Objectives**

In accordance with Section 8.1.16 of the City's Comprehensive Development Ordinance (CDO), the purpose of this TDM plan is to promote the following objectives:

- Reduce parking demand;
- Reduce car ownership;
- Reduce vehicle miles traveled, single occupant vehicle usage and congestion, and;
- Increase transit use and non-motorized travel.

### **Howard Center TDM Program**

Outreach and Education – Howard Center will serve as the designated Transportation Coordinator for the TDM. The specific department and/or employee(s) to serve as the Transportation Coordinator will be identified before occupancy of the new building. The Transportation Coordinator will:

- Make TDM information available to all employees;
- Prepare/disseminate an annual travel survey of all employees; and
- Maintain record-keeping and reporting to the City of TDM activities and participation.

TDM Strategies – This TDM plan will include implementation of at least two (2) of the strategies listed below. The two (2) strategies to be implemented will be identified prior to occupancy of the building.



- 1) Maintain ongoing and active membership in CATMA.
- 2) Provide GMT passes to employees at a minimum discount of 50%.
- 3) Provide free Howard Center owned and operated car share program to employees.
- 4) Provide free bike share membership to employees.
- 5) Provide employees with a shuttle service, guaranteed ride home program, or ride to a nearby transit center.

Parking Management – Howard Center will perform annual parking utilization studies for a period of 7 years from receipt of a Certificate of Occupancy.

TDM Agreement – Prior to occupancy of the new building, Howard Center will provide a signed commitment to and acknowledgement of:

- 1) Ongoing implementation of the TDM program outlined above;
- 2) The project has no claim to the ongoing availability of nearby on-street parking;
- 3) Acknowledge that failure to maintain TDM for the required time period(s) is a violation of City ordinance; and
- 4) To notify any subsequent owners and tenants in writing of their obligations under the TDM section of City ordinance as part of any purchase and sale and/or lease agreements.

## Gilman & Briggs Environmental

1 Conti Circle #5, Barre, VT 05641

Ph: 802-479-7480; [team@gbevt.com](mailto:team@gbevt.com)

### MEMORANDUM

To: Kevin Worden, PE  
From: Art Gilman  
Date: 9 March 2022  
Re: The Howard Center, Englesby Ravine

The Howard Center proposes redevelopment of its facility at 300 Flynn Avenue in Burlington. Englesby Brook, a stream that drains ca. 1 sq. mile of generally urban land, flows through the northern portion of the property in a deep ravine, entering via a culvert under Pine Street, and exiting at the northwest corner of the property. A Class Two, significant wetland occupies the floor of the ravine, extending only very slightly upslope in a couple of areas.

This reach of Englesby Brook is shown on the City of Burlington “Potential Natural Community Types” map (2021) and, indeed, most of the length of Englesby Brook is shown on that map, with various natural community types along its length. For this reason, when I delineated the wetland on 9 September 2022, I also took note of the natural community within Englesby Ravine, and offer the following insight.

First, the Ravine is flat-bottomed as is evident by inspecting the topographic layer on the Existing Conditions plan (Sheet C1-01), and the side-slopes are relatively steep. Thus, the wetland area occupies the full extent of the floor of the Ravine but extends only minimally upslope. The stream itself occupies a very shallow channel through the alluvial soil and, on the date of my visit, had some dry channels in addition to the wetted main channel. That is, the stream course evidently meanders across the whole area over time, and there is evidence of seasonal flooding.

Of note is that the entire wetland is shaded by full-canopy trees, both within the wetland and especially, at its edge. The tree community includes two maples: box elder (*Acer negundo*) and silver maple (*A. saccharinum*), as well as green ash (*Fraxinus pennsylvanica*) and at least one large crack willow (*Salix fragilis*). The shade limits the growth of potential invasive shrubs such as Asian honeysuckles (*Lonicera morrowii* and *L. tatarica*), glossy buckthorn (*Frangula alnus*), etc, which often form streamside thickets in Chittenden County; neither of these are present in the area. Within the wetland there are common native herbs including white grass (*Leersia virginica*), fowl manna grass (*Glyceria striata*), jewelweed (*Impatiens capensis*), fringed loosestrife (*Lysimachia ciliata*), marsh blue violet (*Viola cucullata*), and jumpseed (*Persicaria virginiana*).

The slopes are occupied by box elder and white ash (*Fraxinus americana*), striped maple (*Acer pensylvanicum*) and others, with a limited shrub layer and not many ground-layer plants (again, due to shade and likely to dryness on the well-drained slope).

Most of the plants observed were native to Vermont. Although there are other non-native species present, e.g., multiflora rose (*Rosa multiflora*) and ivy-leaved maple (*Acer campestre*) the only plants listed on the



Vermont's list of non-native invasive plants are one thicket of Japanese knotweed (now known as *Reynoutria cuspidata*), on the slope near the northwest end of the parking lot, and the annual weedy garlic mustard (*Alliaria petiolaris*) on the slope in the same section. Therefore, although in generally good condition given its location, history of impacts, and known water quality problems, this area is hardly pristine. As part of a wetland system connecting the southern part of the City of Burlington between the Lake, Crescent Woods, and the open land of the Burlington Country Club, it assumes some importance. <https://enjoyburlington.com/crescent-woods/>

I did not observe any evidence of animal activity during my work, but I note that a local website with waypoints along Englesby Brook, noted tracks of raccoon, which is a common urban animal. It may provide a feeding source and shelter for that and other such species. <https://www.uvm.edu/place/burlingtongeographic/focalplaces/englesbybrook.php>

The proposed Project is well designed, with better water quality infrastructure than currently exists and very minor intrusion into the wetland's statutory buffer zone—and that only in a mowed lawn area. Notably, there will be no tree removal. The relatively good condition of the wetland in the ravine is maintained, in my estimation by the shade from the tree canopy, which suppresses growth of invasive shrubs, this feature of the project is important. I recommend that, not just during the redevelopment project, but going forward long-term, the Howard Center should prioritize tree growth where it now exists, e.g., retaining the trees now there, replanting any that might die, and adding others as appropriate.

I suggest also controlling the spread of Japanese knotweed from its existing location. This species is notoriously difficult to eradicate but, given that it is already somewhat suppressed by the shade, it can probably be prevented from spreading. The garlic mustard, an annual species, has less impact in this location—it does not appear to be suppressing growth of native plants.



Photo 1: A broad, seasonal flow channel along the bottom of the ravine; the main flow at present is in a different channel.





Photo 2. Looking west. On the left is the slope up toward the Howard Center, at upper right is a large crack willow tree. In the foreground is evidence of seasonal flow and seasonal ponding from Englesby Brook.





Photo 3. Englesby Brook, slightly downstream of the Pine Street culvert. The channel is well-defined, through alluvium. The plant with 5-parted leaves in the foreground is Virginia creeper, a native vine that often climbs trees but sometimes makes a ground-cover.

MARK HALL  
mhall@pfclaw.com

October 11, 2023

Chair, Development Review Board  
Department of Permitting & Inspections  
645 Pine Street  
Burlington, VT 05401

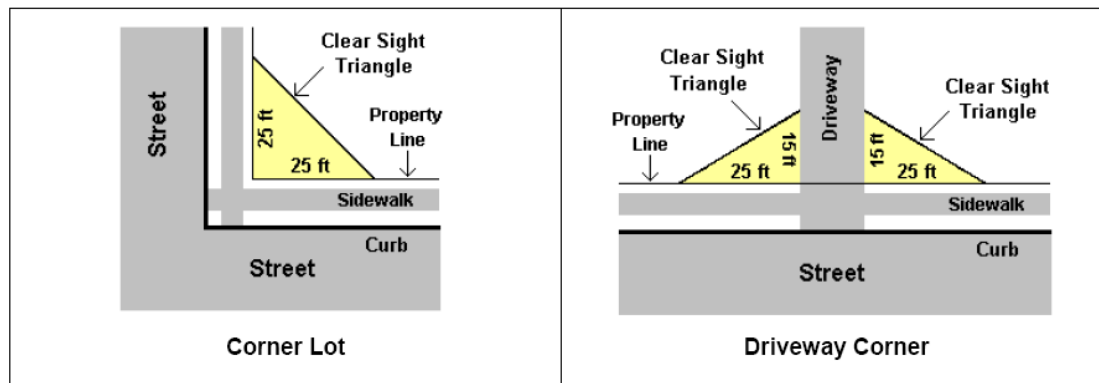
**Re: ZAP-23-11; 457 South Willard Street  
Appeal of Notice of Violation, ZCPT-23-24**

Dear Chair:

This matter involves a dispute over the Arns Green Family Trust's replacement of a fence in its side-yard located at 457 So. Willard Street. On or about July 28, 1980, the Trust's predecessor in title obtained a zoning permit to erect a 6' stockade fence in the side yard *See* Exhibit 1. The fence was again replaced by the Trust in 2020 in the same stockade style. The fence was placed in the same location where a fence has stood continuously since 1980. The only change is that fence now sets on a base that is approximately 20" tall that extends out into the setback a few inches from the fence itself. The fence is slightly higher as a result. *See* Photographs attached as Exhibit 2. No issue exists relative to the fence itself, except that the zoning office has taken the position that the fence could not be re-established in the same location due to the clear sight triangle provision in § 5.2.6(c), which states:

**(c) Clear Sight Triangle**

1. Fences placed within a clear sight triangle along driveways and at street intersections, or between an existing building and the front property line, whichever is less, shall be limited to 3-feet in height above the curb in order to provide safe sight distances for pedestrians and vehicles.



This provision did not exist in 1980, when the original permit was granted, so the fence is a pre-existing nonconforming structure.

Vermont's Zoning Statute, 24 V.S.A. § 4412(7), requires that zoning bylaws define how nonconformities will be addressed, including establishing standards for nonconforming structures. To achieve that purpose, municipalities may regulate nonconformity by adopting any of the following methods:

- (i) Specify a time period that shall constitute abandonment or discontinuance of that nonconforming use, provided the time period is not less than six months.
- (ii) Specify the extent to which, and circumstances under which, a nonconformity may be maintained or repaired.
- (iii) Specify the extent to which, and circumstances under which, a nonconformity may change or expand.
- (iv) Regulate relocation or enlargement of a structure containing a nonconforming use.
- (v) Specify the circumstances in which a nonconformity that is destroyed may be rebuilt.
- (vi) Specify other appropriate circumstances in which a nonconformity must comply with the bylaws.

Burlington has adopted such regulations in Article 5 of the Bylaw. The specific provisions are set forth in § 5.3.5:

#### Sec. 5.3.5 Nonconforming Structures

##### (a) Changes and Modifications:



Nothing in this Part shall be deemed to prevent normal maintenance and repair or structural repair, or moving of a non-complying structure pursuant to any applicable provisions of this Ordinance.

Any change or modification to a nonconforming structure, other than to full conformity under this Ordinance, shall only be allowed subject to the following:

1. Such a change or modification may reduce the degree of nonconformity and shall not increase the nonconformity except as provided below.

Within the residential districts, and subject to Development Review Board approval, existing nonconforming single-family homes and community centers (existing enclosed spaces only) that project into side and/or rear yard setbacks may be vertically expanded so long as the expansion does not encroach further into the setback than the existing structure. Such expansion shall be of the existing nonconformity (i.e. setback) and shall:

- i) Be subject to conformance with all other dimensional requirements (i.e. height, lot coverage, density and intensity of development);
- ii) Not have an undue adverse impact on adjoining properties or any public interest that would be protected by maintaining the existing setbacks; and,
- iii) Be compatible with the character and scale of surrounding structures.

Existing accessory buildings of 15 feet in height or less shall not exceed 15 feet tall as expanded.

Within all districts, and subject to the Development Review Board approval, structures for the purpose of creating an ADU may be constructed on lots with legally non-conforming lot coverage per Sec.5.2.3(b) 10.

2. Such a change or modification shall not create any new nonconformity; and,
3. Such a change or modification shall be subject to review and approval under the Design Review provisions of Article 3, Part 4. When any portion of a nonconforming structure has been made conforming, it shall not be made nonconforming again except as provided for historic building features pursuant to Sec. 5.2.5(b)(4).

(b) Demolition:

A nonconforming structure may be replaced by a new structure retaining the same degree of nonconformity as the original structure. This provision is limited to the existing dimensional nonconformity (i.e. setback, lot coverage, or height), and shall not expand the degree of nonconformity except as provided for in (a) above. The new structure shall be subject to conformance with all other dimensional requirements (i.e. setback, lot coverage, and height). Zoning permit application for the replacement structure shall be completed within 1 year of demolition of the nonconforming structure; failure to do so shall result in the loss of the ability to retain the nonconformity. A non-conforming residential structure may be enlarged up to the dimensional standards of the underlying zoning district, subject to review and approval by the DRB pursuant to Art. 3, Part 4. Design Review and Art. 3, Part 5 Conditional Use Review. Adaptive reuse or residential conversion bonuses may allow a greater expansion than the underlying zoning district allows approved per the provisions of Article 4.

Under § 5.3.5(a) and (b), the Trust is allowed to repair, alter, demolish, and replace a previously permitted fence if it does not increase the level of nonconformity. It does not matter whether the fence is changed in a benign manner, so long as the nonconformity is not increased.<sup>1</sup> Pictures are attached as Exhibit 2 of the two fences and the replacement process. The new fence was installed in conjunction with the old fence being removed, so the old fence was replaced within a year, and it is in the same location where a fence has stood for 43 years. The base, which is only 20 inches high extends out slightly and the fence is a bit higher, but “[c]hanges in a preexisting, nonconforming structure would render the structure ineligible for a conditional use permit only if the changes resulted in an increase in the degree of nonconformance.” *In re Dunnett*, 172 Vt.196, 203-4 (2001) (allowing an increase of the roof line height and volume of a nonconforming structure because the degree of conformity relative to the setback was not increased.) The new fence does not increase the nonconformity relative to the site triangle requirements set forth in § 5.2.6(c)<sup>2</sup>, which is the only nonconformity cited in the NOV.

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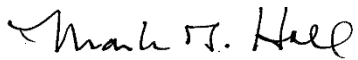
<sup>1</sup> When the matter first came up, the Trust was happy to file an application, but was informed it wouldn't be granted and that a direct appeal of the notice of alleged violation was the proper option.

<sup>2</sup> The base extends a few inches out from the fence, but it is well under 3 feet in height, so it meets § 5.2.6(c), as the site triangle rules only apply above 3 feet.

The Trust is mindful of the City's concern. However, the requirements of § 5.2.6(c) are substantial and difficult to implement in this location without doing a great deal of damage to the internal landscaping and gardens, some of which has taken decades to mature. Given that the Trust essentially just replaced a fence fully permitted for that location, it is not in violation of the ordinance.

Cordially yours,

PAUL FRANK + COLLINS P.C.

A handwritten signature in cursive script that reads "Mark T. Hall".

Mark Hall

MGH:jtg

Enclosures

10016678\_3:15308-00001



# EXHIBIT 1

CITY OF BURLINGTON  
ZONING PERMIT

Permit # 81-068

Project Location 457 So. Willard St. Zone R-6

Applicant E. DAVID MORIN

Owner SAME

Address SAME

Existing Use SINGLE FAMILY

Telephone 862-2455

PROPOSAL ERECT A 6' STOCKADE FENCE. TO CLOSE UP TWO (2) EXISTING WINDOWS ON NORTH SIDE + ADDING A PICTURE WINDOW ON WEST SIDE OF BUILDING; ADDING TWO ELECTRICAL OUTLETS.

Estimated Cost \$ 1200.00

Signature Marcia G. Morin

TECHNICAL

1. Parcel Size \_\_\_\_\_

2. % Lot Coverage \_\_\_\_\_

NA 8

3. Residential Density \_\_\_\_\_

4. Existing/Proposed/Required Parking: 2 / 2 / 2

5. Setback/Side Yards: front 15' side 5' rear 5'

6. Principle Building on Parcel: one ☒ / two ☐ / ☐

7. Change in Use: yes ☐ / no ☒

Pursuant to the provisions of Appendix A, Section 80 (B) of the Burlington Code of Ordinances, Zoning Permit is hereby issued ☒ / contingently issued ☐ / denied ☐ to the above-named applicant for the proposed use on July 28, 1980 for the following reasons: \_\_\_\_\_

This Zoning Permit is subject to:

\_\_\_\_\_ Site Plan Review) By the  
\_\_\_\_\_ Design Review ) Planning  
\_\_\_\_\_ Historic Review ) Commission  
☒ No Further Review

If this zoning permit is contingent upon site plan review, design review and/or historic review as above designated, no act or decision of the Zoning Administrative Officer to issue such permit shall be considered to have been made, nor shall the zoning permit be effective, nor shall the appeal period commence to run, until such review (s) have been completed by the Planning Commission. If the zoning permit is subject to no further review, it shall be effective, and the appeal period shall begin to run, as of the date it is issued. An appeal of this zoning permit may be taken within fifteen (15) days from the date the permit becomes effective. Plans may be viewed in the Zoning Administrator's Office during regular business hours. The final expiration date that appeals may be taken is August 12, 1980 fifteen (15) days after the indicated Planning Commission approval, whichever is later."

# EXHIBIT 2

































































09/01/2023 09:26

**Current**



TO  
TED MILES



Image capture: Oct 2014 © 2023 Google

2' ROW OF FLOWERS GONE  
NO W/PT WALL  
NEW FENCE  
LOT SURVEYED, OVER HER LOT CORNER  
20" +/- INTO RIGHT OF WAY





## PERMITTING & INSPECTIONS

645 Pine Street, Ste. A | PO Box 849  
Burlington, VT 05402-0849

Housing: (802) 863-0442  
Trades: (802) 863-9094  
Zoning: (802) 865-7188

### NOTICE OF ZONING VIOLATION (NOV ZCPT-23-24)

August 28, 2023

ARNS Green Family Trust  
457 South Willard St  
Burlington, Vt 05401

Mailed Certified Mail 70192280000140560735  
And FIRST CLASS MAIL

#### **NOTICE OF VIOLATION AT:**

Address: 457 South Willard St, BURLINGTON, VT  
TAX LOT #054-1-095-000

Zoning Violation# ZCPT-23-24

Dear Owners,

It has come to the attention of this office that a zoning violation exists at 457 South Willard St, Burlington, Vt.

**Description of Violation:** Retaining wall installed and fence installed on top of retaining wall, without a zoning permit.

Burlington Comprehensive Development Ordinance (CDO) Article(s): 2, 3, 5, 8, 12, and 24 VSA §4451.

Please be advised that violations of the CDO are subject to fines of up to two hundred dollars (\$200.00) for each day that a violation continues. You may submit an application to attempt correction of the violation, however, be advised application and filing fees are subject to a fee increase for permits required to correct a violation.

This correspondence serves as a formal notice of a zoning violation pursuant to 24 V.S.A §4451. You have seven (7) days from receipt of this notice to cure the referenced violation. Additional warnings for the violation are not required and will not be forthcoming. In the event that the violation is not cured or remedied as provided for in this notice, the City will pursue enforcement of the violation as provided for by law.

This Notice of Violation (NOV) may be appealed to the Burlington Development Review Board in accordance with the provisions of CDO Sections 2.7.12 and 12.2.2 provided that such appeal is filed within fifteen (15) days of the date of this NOV August 28, 2023, online at <https://burlingtonvt.viewpointcloud.com/categories/1098> and accompanied by the appropriate fee, (\$250), in accordance with Sec. 3.2.4(a) of the CDO. Or Appeal fee and complete application shall be filed with the City's Zoning Office (645 Pine Street) by **4 pm on September 12, 2023**; an appeal shall not be perfected until the fee is received.

If you have any questions, please call Ted Miles or William Ward at (802) 863-0442.

Sincerely,

William Ward  
Zoning Administrative Officer

Sincerely,

Theodore Miles  
Code Compliance Officer

Cc: Land Records for Tax Lot # 054-1-095-000

### VIOLATION DETAILS

**LOCATION:** 457 South Willard St, Burlington

**DECISION DATE:** August 28, 2023

**VIOLATION DESCRIPTION:** Retaining wall installed and fence installed on top of retaining wall, without a zoning permit. Fence violates clear site triangle BCO sec 5.2.6(c).

**FINDINGS:** Retaining wall installed and fence installed on top of retaining wall, without a zoning permit. Fence violates clear site triangle BCO sec 5.2.6(c).



**REMEDY OPTIONS:** Within seven (7) days from receipt of this notice you may cure the violation by:

- 1) – Removing the violation noted above, by removing the vehicle, removing the retaining wall and fence **and restoring the Premises to its prior state, and informing the Zoning Office that the violation has been removed so our office may verify compliance; or**
- 2) - Obtaining approval from the City's Zoning Office for Retaining wall installed and fence installed on top of retaining wall, without an approved zoning permit (permit application **fee is doubled** if complete application is submitted within seven days from receipt of the NOV, **tripled** if a complete application is submitted 7-15 days from receipt of the



NOV, or triple plus \$75 per hour of staff time (up to \$500) if a completed application is submitted after 15 days from date of NOV receipt). See CDO Section 2.7.8. **PLEASE NOTE:** If the zoning permit request is denied, the violation is **NOT** cured. Owner shall be required to remove the violation as noted in #1 above or request an agreement as noted in #3 below within five (5) business days from date of the permit denial; **or**

3) - Entering into an Agreement with the City of Burlington to extend deadlines in which to come into compliance with the City's ordinance (**administrative fees required**).

**APPEAL  
RIGHTS:**

You have the right to appeal the enforcement officer's decision that a zoning violation exists on your property to the Development Review Board in accordance with the provisions of Articles 2.7.12 and 12.2.2 of the CDO within fifteen (15) days **from the date of this notice.** **The deadline for filing an appeal is 4 pm on September 12, 2023.** Submit a complete application with ZV# and appropriate fee, (\$250), to the City's Zoning Office at 645 Pine St, or online at <https://burlingtonvt.viewpointcloud.com/categories/1098> accompanied by a memo stating the ZV#, the owner's name and address, a brief description of the property with respect to which the appeal is taken, a reference to the regulatory provisions applicable to that appeal, the relief you are requesting, and the alleged grounds why such relief is believed proper under the circumstances. *Failure to appeal constitutes admission that the violation exists, and the decision of the enforcement officer shall be binding 24 V.S.A §4472(d).*

**REGULATION  
CITATION:**

CDO Article(s): 2, 3, 5, 8, 12 and 24 VSA §4451



**Department of Permitting and Inspections**

645A Pine St, PO Box 849  
Burlington, VT 05402-0849

**VOICE (802) 863-0442**

**FAX: (802) 652-4221**

**TO:** Development Review Board

**From:** Ted Miles

**Date:** October 17, 2023

**RE:** **ZAP-23-11**; 457 South Willard Street - Appeal of an Administrative Officer's Zoning Notice of Violation (ZCPT 23-24), Retaining wall installed and fence installed on top of retaining wall, without a zoning permit.

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**Note:** This is the Administrative Officer's report; decisions are made by the Development Review Board, which may overturn or uphold the Zoning Administrator's Decision. **THE APPLICANT OR REPRESENTATIVE MUST ATTEND THE MEETING.**

**Location:** 457 South Willard St, Burlington, Vermont

**Tax Lot # 054-1-095-000**

**Appellant:** ARNS Family trust

**Representative:** Mark Hall Esq

**Applicable Regulations:** CDO Articles 2, 3, 4, 5, 8, 12 and 24 VSA §4451

**Appeal # ZAP 23-11 filed on September 7, 2023.**

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**Violation:**

A. Retaining wall installed and fence installed on top of retaining wall, without a zoning permit.

**CDO Article 2. Enforcement Timeline**

1. April 14, 2023. Received complaint that a new fence was installed and relocated from where original fence was. Fence was installed on a new retaining wall.
2. April 14, 2023. Warning letter was sent to owner of property identified as ARNS Family trust, 457 South Willard st, Burlington, Vt.
3. August 28, 2023. A notice of Violation was mailed to the owner of the property noting the violation of Retaining wall installed and fence installed on top of retaining wall, without a zoning permit.
4. September 7, 2023. Received timely appeal for Notice of Violation issued on August 28, 2023.

### **Zoning Permit History:**

- **ZP 81-068 Erect a 6' stockade fence. To close up two (2) existing windows on north side & adding a picture window on west side of building; adding two electrical outlets.** (No site plan was with this approved permit).
- **ZP 89-136 Enclose existing rear porches to provide year-round living space. Construct 6'6 x 6' deck on rear. /with stairs to rear yard.**
- **ZP 08-220, (ZP08-772CA original zoning permit number), Replace asphalt roof on porch with standing seam copper roof.**

### **CDO Article 3 Part 1: General provisions and Zoning permits**

#### **Sec. 3.1.2 (a) 3**

*Except for that development which is exempt from a permit requirement under subsection (c) of this section, no development may be commenced within the city without a zoning permit issued by the administrative officer including but not limited to the following types of exterior and interior work:*

#### **(a) Exterior Work**

##### **7. Fences, retaining walls**

Although not included in the violation notice, it bears mentioning that the new fence and retaining wall do not comply with the clear sight triangle standards.

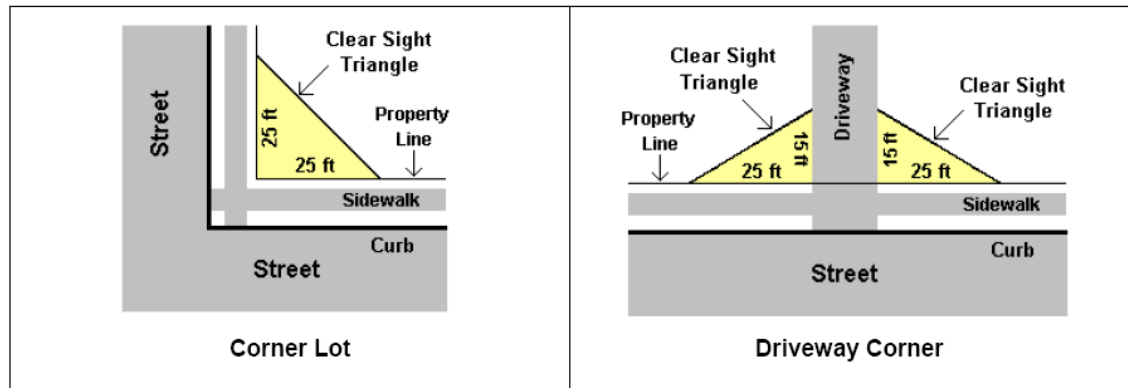
### **CDO Article 5 Part 2: Dimensional Requirements**

#### **Sec. 5.2.6, Building Height Limits**

#### **(b) Clear Sight Triangle**



1. Fences placed within a clear sight triangle along driveways and at street intersections, or between an existing building and the front property line, whichever is less, shall be limited to 3-feet in height above the curb in order to provide safe sight distances for pedestrians and vehicles.



## **CDO Article 12. Appeals, Conditional Uses, Variances**

Appellant filed a complete appeal as outlined under CDO Article 12 Sec. 12.2.2

### **SUMMARY:**

The current fence that was installed approximately two years ago was relocated westerly approximately six (6), inches and was installed on top of a short retaining wall that did not exist previously. The relocation and additional height of the fence due to the retaining wall triggered the requirement for a new zoning permit. The new fence violates the clear site triangle.

Photos of the existing conditions from a google earth image dated 2014 and a current photo dated September 1, 2023 enclosed.

### **CONCLUSION:**

The Code Compliance Officer for Permitting and Inspections Department hereby requests the Development Review Board uphold ZV #ZCPT 23-24 as valid.